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# Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Heating, Ventilating, and Air Conditioning (HVAC) Systems

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This research project has provided improved maintenance resource data for use during facility planning, design, and maintenance activities. Data bases and computer systems have been developed to assist planners in preparing DD Form 1391 documentation, designers in life-cycle cost component selection, and maintainers in resource planning. The data bases and computer systems are being used by U.S. Army Corps of Engineers (USACE) designers at the District and installation levels and by resource programmers at USACE Headquarters, and Army Major Commands and installations. These research products may also be useful to other Government agencies and the private sector.

This report describes the building task maintenance and repair data base development and gives examples of its application. It is one of a series of special reports on the maintenance and repair data base. While this report describes HVAC systems, other reports in the series cover architectural, plumbing, and electrical systems.

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## FOREWORD

This research was conducted for the Directorate of Military Programs, Headquarters, U.S. Army Corps of Engineers and the Office of the Assistant Chief of Engineers under various research, development, testing, and evaluation (RDTE) and reimbursable funding documents. Work began under RDTE in 1980 and continued in reimbursable projects during 1984 through 1989. The technical monitor for the RDTE part was Dr. Larry Schindler (CEMP-EC) and for the reimbursable part was Ms. Val Corbridge (DAEN-ZCF-R).

The work was performed by the Facility Systems Division (FS), U.S. Army Construction Engineering Research Laboratory (USACERL). The Principal Investigators were Dr. Edgar Neely and Mr. Robert Neathammer (USACERL-FS). The primary contractor for much of the data development was the Department of Architectural Engineering, Pennsylvania State University. Dr. Michael O'Connor is Chief of USACERL-FS.

COL Everett R. Thomas is Commander and Director of USACERL, and Dr. L.R. Shaffer is Technical Director.



# CONTENTS

	Page
SF 298	1
FOREWORD	2
LIST OF TABLES AND FIGURES	4
 1 INTRODUCTION .....	5
Background	5
Research Performed and Reports Published	6
Objective	10
Approach	10
Scope	10
Mode of Technology Transfer	10
 2 PROBLEM DEFINITION .....	11
 3 DATA BASE DEVELOPMENT .....	12
Introduction	12
Historical Data Review	12
Engineered Performance Standards	12
Committee Reviews	13
Building Subdivision	13
Task Data Development	14
Component Summary Tables	19
Life-Cycle Cost Analysis Tables	23
 4 DATA BASE APPLICATION EXAMPLES .....	27
Introduction	27
Terminology	27
Examples	29
 REFERENCES .....	41
 LIST OF ACRONYMS .....	42
 APPENDIX A: Life-Cycle Cost Analysis (7 Percent)	45
APPENDIX B: Life-Cycle Cost Analysis (10 Percent)	103
APPENDIX C: Technical Bulletin Index for Engineered Performance Standards	160
APPENDIX D: Geographical Location Adjustment Factors	163

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## TABLES

Number		Page
1	Typical Task Data Form	7
2	Typical Component Summary	8
3	Life-Cycle Cost Analysis	9
4	Task GT-190	16
5	Task VT-6	17
6	Task VT-270	18
7	Tasks for a 200T Water Cooled Chiller	19
8	Task Summary Data for a 200T Water Cooled Chiller	21
9	200T Chiller Spreadsheet - Labor Hours	22
10	7 Percent Discount Factors From Date of Study	24
11	10 Percent Discount Factors From Date of Study	25
12	Calculation Sheet - Example 1	32
13	Calculation Sheet - Example 2	34
14	Calculation Sheet - Example 5	38
15	Calculation Sheet - Example 6	40

## FIGURES

1	HVAC Zone Map	15
2	DOS, BOD, EOS Relationship	28

# BUILDING MAINTENANCE AND REPAIR DATA FOR LIFE-CYCLE COST ANALYSES: HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEMS

## 1 INTRODUCTION

### Background

Maintenance\* and repair (M&R) cost estimates are needed during planning, design, and operations/maintenance of Army facilities. During planning, life-cycle costs are needed to evaluate alternative ways of meeting requirements (e.g., lease, new construction, renovate existing facilities). During design, M&R requirements for various types of components, such as built-up or shingle roofs, are needed so that the total life-cycle cost of different designs can be minimized. Finally, once the facility has been constructed, outyear predictions of maintenance and repair costs are needed so that enough funds can be programmed to ensure that Army facilities are maintained properly and do not deteriorate due to lack of maintenance.

The Directorate of Engineering and Construction (EC), Headquarters, U.S. Army Corps of Engineers (HQUSACE),\*\* asked the U.S. Army Construction Engineering Research Laboratory (USACERL) to coordinate the assembly of a single centralized maintenance and repair data base for use by Corps designers. This research was required because designers were not able to obtain reliable maintenance and repair data to support their life-cycle cost (LCC) analysis from installations or from the technical literature. One of the first tasks in the research effort was to determine if reliable data bases, which could be adapted for Corps use, existed in government or private industry. Comprehensive data bases of maintenance costs for government and private sector facilities did not exist. The little data available always depended on widely varying standards of maintenance used to maintain the facilities for which the data was collected and thus was unreliable for prediction purposes. Recognizing this, HQUSACE asked USACERL to develop a maintenance and repair cost data base. This data is for use by U.S. Army Corps of Engineers (USACE) designers in performing life-cycle cost analyses during the design of new facilities. Initial results were presented in several USACERL reports.<sup>1</sup>

Soon after this request, the Facilities Programming and Budgeting Branch of the Facilities Engineering Directorate asked USACERL to develop prediction models for outyear maintenance requirements of the Army facility inventory. The Programming Office of EC, responsible for Military Construction, Army (MCA) planning, also requested that USACERL provide methods and automated tools to help installations perform economic analyses. Part of the objective was to allow analysts to obtain future maintenance cost data.

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\*Maintenance in this report means all work required to keep a facility in good operating condition; it includes all maintenance, repair, and replacement of components required over the life of a facility.

\*\*At the time of this request, EC was part of the Office of the Chief of Engineers, which has since reorganized. In addition, EC has now become the Directorate of Military Programs.

<sup>1</sup> R D Neathammer, *Life-Cycle Cost Database Design and Sample Cost Data Development*, Interim Report P-120/ADA0997222 (U.S. Army Construction Engineering Research Laboratory [USACERL], February 1981); R.D. Neathammer, *Life-Cycle Cost Database: Vol I, Design*, and *Vol II, Sample Data Development*, Technical Report P-139/ADA126644 and AIDA126645 (USACERL, January 1983), Appendices E through G.

In response to these requests, USACERL began a multiyear effort to develop a comprehensive maintenance and repair cost research program for buildings. This coordinated program is the key to all detailed estimation of future maintenance costs for Army facilities.

## Research Performed and Reports Published

This is one of several interrelated reports addressing maintenance resource prediction in the facility life-cycle process. The total research effort is described in a USACERL Technical Report.<sup>2</sup>

The first research product was a data base containing maintenance tasks related to every building construction component. This data base provides labor, material, and equipment resource information. The frequency of task occurrence is also included. This information is published in a series of four USACERL Special Reports by engineering systems: (1) architectural, (2) heating, ventilating, and air-conditioning (HVAC), (3) plumbing, and (4) electrical. The title for the series is *Maintenance Task Data Base for Buildings*.<sup>3</sup> Table 1 shows an example from this data base. This data is also available in electronic form. The data base is used in a personal computer (PC) system under the Disk Operating System (DOS). This computer program allows a facility to be defined by entering the components and component quantities comprising the facility. The tasks are used to determine the resources required annually to keep the facility maintained.

The second research product was a component resource summary for the first 25 years of a facility. The tasks for the component were scheduled and combined into one set of annual resource requirements. This annual resource information is published in a series of four USACERL Special Reports titled *Building Component Maintenance and Repair Data Base*.<sup>4</sup> An example from this data base is shown in Table 2. The data base is also available in electronic form. This data can be used to perform special economic analyses such as one for a 20-year life using a 10 percent discount rate.

The third research product was a set of 25-year present worth factor tables for use by designers in selecting components for discount rates of 7 and 10 percent. The annual component resource values were multiplied by the appropriate present worth factor and added for the 25 years to produce one set of resource values. This information is published in a series of four USACERL Special Reports titled

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<sup>2</sup> E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Resource Prediction in the Facility Life-Cycle Process*, Technical Report P-91/10 (USACERL, March 1991).

<sup>3</sup> E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings. Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/21 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings. Plumbing Systems*, Special Report P-91/18 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings. Electrical Systems*, Special Report P-91/25 (USACERL, May 1991).

<sup>4</sup> E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings. Architectural Systems*, Special Report P-91/27 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance Data Base for Buildings. Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/22 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings. Plumbing Systems*, Special Report P-91/30 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings. Electrical Systems*, Special Report P-91/19 (USACERL, May 1991).

Table 1

## Typical Task Data Form

Task Code: 0991551Component: CHILLER WAT.COOL REC.200T System: COOLING GENERATION Subsystem: EQUIPMENTTask Description: M/R REPAIR HERMETIC CHILLERUnit of Measure: COUNTPersons per Team: 4 Task Duration: 4,5175 hoursTrade: REFRIG/AIR COND. Task Classification: 1

## Labor Resources

Subtask Description	Labor Hours
1. REPAIR CONTROLS	0.500000
2. REMOVE/REPLACE COMPRESSOR(2)	11.600000
3. REMOVE/REPL. EVAPORATOR TUBE	0.900000
4. REMOVE/REPLACE CONDENSER TUBE	0.900000

## Material Resources

Description	Quantity	Unit Cost
COMPRESS	2	20700.0000
EVAP. TUBE	1	100.0000
COND. TUBE	1	100.0000
		41600.0000

ZONE	FREQUENCY OF OCCURRENCE		
	HIGH	AVERAGE	LOW
1	4.400	8.800	13.200
2	4.800	9.600	14.400
3	7.600	15.200	22.800
4	7.400	14.800	22.200
5	9.800	19.600	29.400
6	5.000	10.000	15.000
7	16.050	32.100	48.150
8	23.200	46.400	69.600
9	22.800	45.600	68.400
10	29.250	58.500	87.750
11	96.150	192.300	288.450

## SUMMARY

Resources UOM	Direct	Indirect	Total
Labor Hours	13.900000	4.170000	18.070000
Material Cost \$	41600.000000		41600.000000
Equipment Hours			4.517500
Components in This Task:	0991550		

Table 2

## Typical Component Summary

CACES No.: 099155 -Chiller Wat.Cool Rec-200T      099161-Chill. Hermetic Cent. 100T

Labor Hours	Materials \$	Equipment Hours	YR	Labor Hours	Materials \$	Equipment Hours
22.7500	0.0000	11.3750	1	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	2	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	3	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	4	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	5	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	6	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	7	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	8	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	9	33.1500	0.0000	16.5750
40.8200	44096.0000	15.8925	10	49.9200	22331.0200	24.9600
22.7500	0.0000	11.3750	11	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	12	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	13	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	14	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	15	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	16	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	17	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	18	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	19	33.1500	0.0000	16.5750
74.1000	53000.0000	18.5250	20	62.4000	37789.0000	15.6000
22.7500	0.0000	11.3750	21	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	22	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	23	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	24	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	25	33.1500	0.0000	16.5750

All data is per unit.

*Building Maintenance and Repair Data for Life-Cycle Cost Analyses.*<sup>5</sup> Table 3 shows an example from this data base. The data base is also available in electronic form. The first three resource columns provide data to allow designers to calculate the life-cycle costs at any location by multiplying by the correct labor rate, equipment rate, and material geographic factor. The multiplication and addition have been performed for the Military District of Washington, DC, and results are given in the fourth column of the table. The right section of the table is information that can be entered into computer systems that perform life-cycle cost analysis.

<sup>5</sup> E.S. Neely, R.D. Neathammer, J.R. Stirm, and R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses Architectural Systems*, Special Report P-91/17 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirm, and R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses Plumbing Systems*, Special Report P-91/24 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirm, R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses Electrical Systems*, Special Report P-91/26 (USACERL, May 1991).

**Table 3**  
**Life-Cycle Cost Analysis**

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE											PAGE 15
COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d = 10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
	um	By Resources			Washington D.C. Total	Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment		labor	material	equipment	labor	material	equipment
CHILLER WAT. COOL. REC. 50T REPAIR HERMETIC CHILLER	CT	171,17960	5275,36630	83,57650	8676.42	22,37754	0.00000	11,1877	48,10000	13900.00000	12,02500
CHILLER WAT. COOL. REC. 100T REPAIR HERMETIC CHILLER	CT	174,22440	11968,78020	83,57051	15650.10	22,37754	0.00000	11,18477	18,07000	11236.00000	6,02333
CHILLER WAT. COOL. REC. 10T REPAIR HERMETIC CHILLER	CT	167,40302	1651,11960	73,09109	4756.36	19,82011	0.00000	9,91008	18,07000	29044.00000	4,51750
CHILLER WAT. COOL. REC. 20T REPAIR HERMETIC CHILLER	CT	174,22440	19602,56480	83,57051	22363.96	22,37754	0.00000	11,18477	20,80000	5300.00000	5,26500
CHILL. HERMETIC CENT. 100T REPAIR CHILLER	CT	11209,25578	245,62459	120,98754	16381.26	32,6078	0.00000	16,30364	18,07000	44096.00000	4,51750
CHILL. HERMETIC CENT. 300T REPAIR CHILLER	CT	249,5803	27457,12208	121,95610	32709.15	32,60728	0.00000	16,30364	62,40000	37789.00000	15,60000
CHILL. HERMETIC CENT. 600T REPAIR CHILLER	CT	257,35000	75437,35008	121,91796	80647.07	32,60728	0.00000	16,30364	97,50000	61771.50000	24,37500
CHILL. OPEN CENT. 300T REPAIR CHILLER	CT	628,20642	27457,12208	311,24890	40890.58	85,03467	0.00000	42,51723	162,50000	137200.00000	8,12500
CHILL. OPEN CENT. 600T REPAIR CHILLER	CT	257,35000	75437,35008	121,91796	80647.07	32,60728	0.00000	16,30364	28,21000	61771.50000	24,37500
									162,50000	137200.00000	40,63500
									16,77000	199283.19000	8,34500

See NOTES on the last page of this table for Explanation of Column Headings

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A fourth research product was a PC system that allows facilities to be modeled by entering the components that comprise the facility. Future years resource predictions are produced by applying the individual tasks and then forming resource summaries by subsystems, systems, facilities, installations, reporting installations, Major Commands (MACOMS) and Army. A summary level computer system was also developed for use by the Department of the Army (DA) and MACOMS. The summary level system applies the most basic data contained in the current facility real property inventory files: (1) current facility use, (2) floor area, and (3) construction date. User's and system's manuals will be published as USACERL ADP Reports.

## Objective

The objective of this report is to describe the task development process for HVAC systems and give examples for using these tasks.

## Approach

The first activity in the research was to survey the literature for available maintenance data. No comprehensive task resource data base was located. The Navy has developed a series of manuals dealing with labor hours required to perform several basic maintenance tasks. This work has been adopted by the Department of Defense (DOD) for triservice use. A series of Technical Bulletins (TBs) under the general title *Engineered Performance Standards* has been published.

The next activity was to survey USACE District offices to solicit their input for a data base. A guiding committee composed of District personnel, installation representatives, and private sector consultants met and agreed upon a general data base design. More importantly, they recommended that the data base be developed using the Engineered Performance Standards rather than historical data.

Once the data base was developed, component summaries were created by summing all tasks for a component. These summaries were then input into a program that computed present worth values for each component.

The calculation procedures described in this report were performed and summarized for standard Army life-cycle analysis of 25 years with a 7 or 10 percent present worth factor. Final results are published in the USACERL Special report series, *Building Maintenance and Repair Data Base for Life-Cycle Analyses*.

## Scope

The task data base is for DOD designers and can also be used by those in the private sector.

## Mode of Technology Transfer

The tables pertinent to designer use will be issued as a supplement to Technical Manual (TM) 5-802-1, *Economic Studies for Military Construction Design—Applications*.



## 2 PROBLEM DEFINITION

In the facility life-cycle process, costs are incurred in construction, operation, maintenance, and disposal of a facility. Past emphasis during the planning, design, and construction phases has been on estimating initial construction costs. The impact of operating and maintaining facilities has always been a secondary consideration. In many cases, the operation and maintenance (O&M) costs are far greater than initial construction costs. Building owners are concerned with the total ownership costs of facilities rather than just the initial construction costs.

The Army has realized the importance of performing total life-cycle cost analyses for facilities at the design stage of accurately forecasting these costs for funds programming. HQUSACE asked USACERL in 1980 to develop a method of estimating future maintenance costs for buildings. In 1982, the programming branch of the former Facilities Engineering Directorate asked USACERL to develop effective models for forecasting facility maintenance resource requirements based on the actual facility.

Life-cycle cost economic studies are an integral part of facility design in the MCA program. Requirements for performing these studies are given in:

- Statutes, Code of Federal Regulations, and Executive Orders for performing analyses when energy is a key cost and for wastewater treatment plants
- USACE *Architectural and Engineering Instructions: Design Criteria*
- Army Regulation (AR) 11-28, *Economic Analysis and Program Evaluation for Resource Management* for general economic analyses
- TM 5-802-1, *Economic Studies for Military Construction Design—Applications*.

The main purpose of these studies is to minimize the life-cycle costs of Army facilities.

To perform life-cycle cost analyses on facility designs, three categories of costs are needed: initial, operating, and maintenance. Initial costs are usually easy to estimate through existing cost estimating systems such as the Corps of Engineers Computer Assisted Cost Estimating System (CACES) and standard publications such as Means or Dodge. Operating costs can be estimated by using energy consumption models such as the Corps of Engineers Building Loads Analysis and System Thermodynamics (BLAST) program or the Trane Company's Trace program. However, accurate estimates of maintenance costs are not available.

There are no comprehensive data bases of maintenance costs for building components either in the private sector or State/Federal Governments. Some historical data is available from the Building Owners' and Managers' Association reports. Within the Army, the Integrated Facilities System (IFS) contains some historical data; however, it does not have a feature for retaining several types of a building component (e.g., having brick and wood exteriors or three types of floor covering). Moreover, the data in IFS has not been kept current. For example, at one installation several family housing units were shown as having wood siding when, in fact, they had been covered with aluminum siding several years earlier.

### 3 DATA BASE DEVELOPMENT

#### Introduction

Historical data within the Army and other agencies was reviewed to determine the availability of accurate resource data. The best source of labor resource data was the Engineered Performance Standards<sup>6</sup> adopted by DOD for use by all DOD agencies. The advisory committee decided to develop a maintenance task data base using the Engineered Performance Standards as the basis for the labor resources.

A typical building was subdivided into systems, sub-systems, and components. All maintenance, repair and replacement tasks were listed for each component. The resources required to perform each task were identified and the significance of the task resources discussed. Component summary tables listing resources by component age were developed by combining all tasks that were scheduled to be performed during each year. A summary of labor, material, and equipment requirements was given by component age. Life-cycle costs analysis tables were created by applying discount factors to the resources given in the component summary tables. The resulting tables can be used to perform life-cycle cost analysis.

#### Historical Data Review

Extensive research was performed during a 3-year period of reviewing the available historical data at several installations. This research revealed that a large portion of the component replacement tasks was not performed when replacement was required, due to lack of available funding, but was completed several years later. Most replacements performed by contract were not entered into the corporate data base. Most installations maintained few historical records because there was no Army regulation requiring such records to be kept. When component replacement dates were available, the comparable component installation or previous replacement dates were unknown, thus, accurate frequencies could not be established.

The task description fields given for the tasks performed were often blank or the descriptions given were very vague. Often several tasks were reported on one entry. Most entries gave a dollar cost but provided very little information about labor hours, materials, and equipment hours. Discussions with service personnel revealed that the data recorded on the forms may not actually relate to the resources required to perform the work.

In conclusion, all maintenance personnel interviewed stated clearly and emphatically that the current historical data cannot be used to develop accurate resource predictions. This data is erroneous, incomplete, and inaccurate.

#### Engineered Performance Standards

In 1955 the new use of maintenance management for public works and public utilities required that a greater portion of the maintenance work be planned and estimated. The general absence, however, of

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<sup>6</sup> Army Technical Bulletin 420-1 through 420-51.

adequate and reliable maintenance estimating data severely handicapped any increase in the number of estimates, and, more seriously, the production of accurate estimates. About this time, the Department of Defense directed that standards for work should be developed to the maximum feasible extent and applied throughout the military establishment. As a result of that directive, Engineered Performance Standards were developed.

The Navy undertook a large research program to perform time and motion studies of maintenance personnel as they performed their maintenance tasks. After several manyears of effort, the Navy published the results under the title *Engineered Performance Standards*. Both Army and Air Force maintenance personnel reviewed this set of manuals and adopted it for official use. Today, the Engineered Performance Standards are used by all DOD agencies and are published as one set of reports carrying three different publication numbers for the Army, Navy, and Air Force.

### Committee Reviews

At the beginning of this research project HQUSACE and USACERL formed an advisory committee composed of representatives from all offices involved in performing life-cycle cost analysis. The basic objective of the advisory committee was to involve as many appropriate and knowledgeable people as possible in deciding how to solve the M&R data base problem. The advisory committee reviewed the historical information research results and the Engineered Performance Standards research program and reports. After lengthy discussion of all possible alternatives, the advisory committee decided to develop a maintenance task data base using the Engineered Performance Standards as the basis for the labor resources. The advisory committee was active for the first two years of the project.

A second maintenance steering committee was formed that was composed of one representative from each HQDA office involved in maintenance resource programming and planning, six major commands, and 10 installations. This maintenance steering committee had the same basic objective as the first advisory committee. In addition, the steering committee wanted to use the data developed to predict actual maintenance resource requirements at installations.

### Building Subdivision

The UNIFORMAT method of dividing a building into systems, subsystems, and components was adopted because it is used by all Federal construction agencies and many private organizations. Systems requiring little maintenance such as foundations and superstructure were not considered.

The level of component detail was determined by the members of the maintenance steering committee. This level varied, depending on the facility classification and the costs versus the benefit of collecting and maintaining data. For example, in the typical building the steering committee voted to stop at the door level and not define hardware requirements because the hardware was not a costly item, but for historical family housing, where one hinge could cost \$200, all door hardware had to be defined.

## Task Data Development

HVAC resources vary with the climatic zones shown in Figure 1. Resource information by zone is given for HVAC components in Appendices A and B. For all examples climatic zone 6 was used.

A task is defined as the work performed by a single trade. Each task is divided into the labor, material, and equipment resources required to perform the work. By separating the tasks in this manner the data can also be used to determine manpower staffing requirements and equipment requirements. The following procedures have been used to develop the tasks for this research project. Identical procedures can be applied to develop new tasks not currently covered in the task data base.

The task development procedures can be demonstrated by using the existing task number 0991551, "Repair Hermetic Chiller," as shown in Table 1. This task involves repairing the controls, and replacing the compressor, evaporation tube, and the condenser tube.

The first step is to obtain a copy of DA Pamphlet 25-30, *Consolidated Index of Army Publications and Blank Forms*. A list of the current TBs covering Engineered Performance Standards (EPS) is given in Appendix C. Review this list to determine which TBs seem to address the task to be developed. The TBs can be obtained from your library or from:

Naval Publications and Forms Center  
5801 Tabor Ave.  
Philadelphia, PA 19120

Once the TBs are available, the second step is to review the Table of Contents of each to determine if tasks related to the component are covered in the bulletin. If the tasks to be developed are covered by the bulletin, review the tasks to determine if the data given can be applied to the task under development. When tasks related to the new component tasks under development are not covered by EPS, other sources such as estimating books and manuals, national standards, trade publications, and manufacturer data must be researched. It is important to provide a complete list of such materials. A reference librarian can provide resources addressing a specific component.

The first step of repairing a hermetic chiller is to repair the controls. A review of EPS subtasks enabled us to estimate the labor rate from TB 420-6 GT-190, page 153 shown in Table 4. The table gave the labor rate as .51121 hr/job, or .50000 hr/job.

The task of removing the old compressor and replacing it was found in TB 420-8, Table VT-6, page 41 shown in Table 5 and is 5.82358 hr/system. The hermetic chiller has 2 compressors so the labor rate was doubled to 11.64716 hr/job, or 11.60000 hr/job.

There was no specific listing in the EPS subtasks for the removal and replacement of either the evaporation tube or the condenser tube. The labor rate was estimated by using TB 420-8, Table VT-270, page 98 shown in Table 6. It was .89400 hr/job, or .90000 hr/job, for each of the tubes.

The total direct labor hours to perform the entire job would be the sum of all subtasks, or 13.9000 hr/job. The indirect time or the time to plan the work, load the truck at the beginning of the day, unload the truck at the end of the day, personal time, delay time, and material handling time must be included to obtain the total onsite labor time. In EPS, this value is expressed as a percentage of the direct labor. When all factors have been considered, the direct labor should be increased by 30 percent or 4.17000 hr/job.

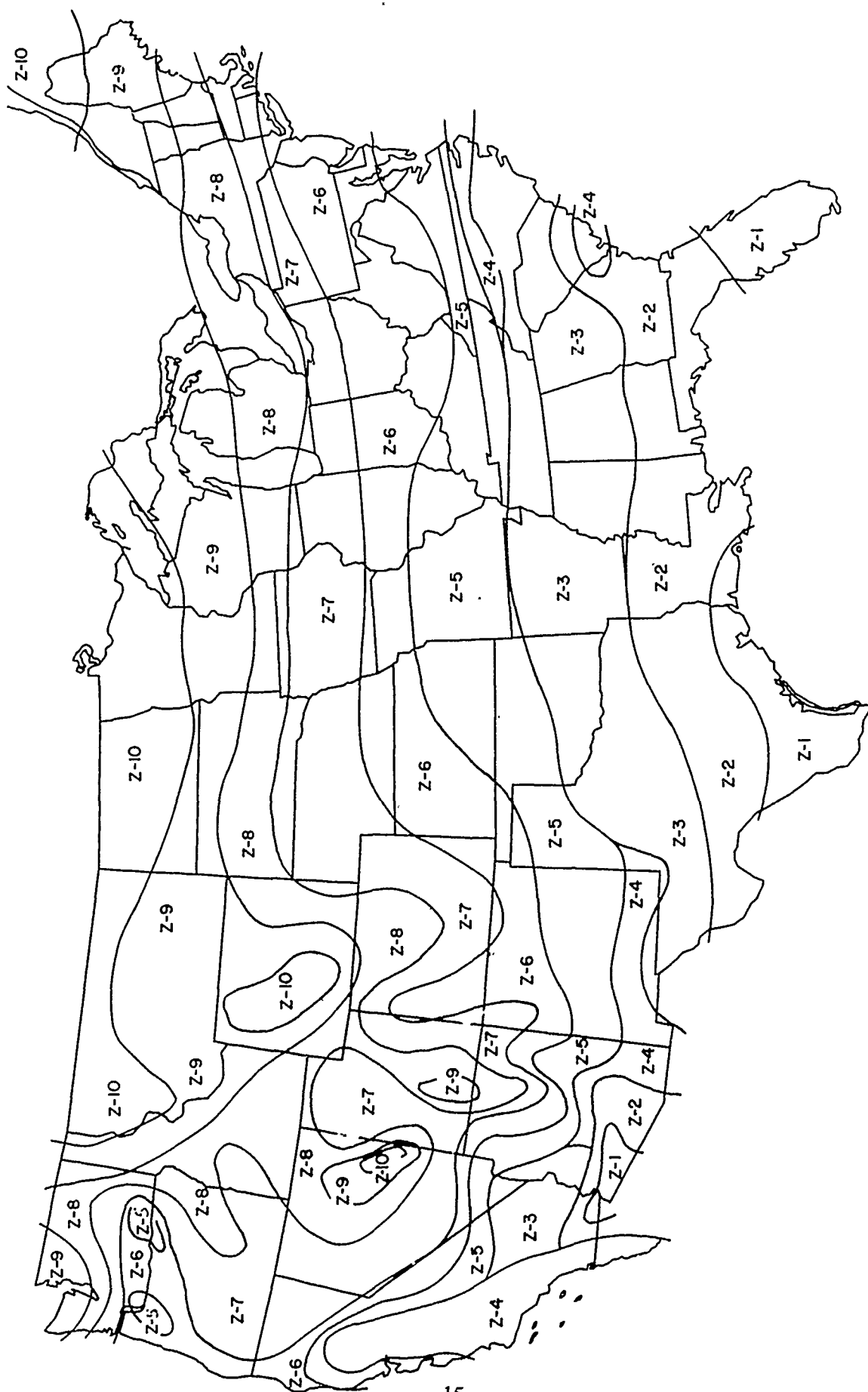


Figure 1. HVAC zone map.

Table 4  
Task GT-190\*

No.	Reference	Work Unit Description	Hours	Units
1	PWG-4-XXII	Cut, form and align 10 wires,	.00132	Box
		10 wire ends per box.	.09156	Box
2	PWG-4-X	Splice, solder and insulate 5	.07859	Box
		pairs of wire ends. 5 splices per box.	.3950Q	Box

\*GT-190 = .51121 hr/box.

The steering committee wanted to apply the same material costs for all planning, programming, design, construction, and operations activities. For this research project, all material costs were developed using prices in the Washington, DC area. Material prices for exact locations throughout the world can be obtained by multiplying the Washington, DC area costs by the appropriate location adjustment factor published in a Programming, Administration, and Execution System (PAX) Newsletter under the title "Area Cost Factor Indexes." A copy of the 22 September 1988 indexes are given in Appendix D, Geographical Location Adjustment Factors. The *CACES Unit Price Book* for Region II dated July 1, 1985 has been used for all costs and can be obtained from the Corps District Cost Estimating Section.

In reviewing material prices, there will usually be many grades listed for the component in question. Since only one entry for the component task will be made for the maintenance data base, it is important to use the middle grade for pricing. This will produce an average material cost.

When materials are not given in the CACES manuals, other material pricing manuals, such as Means, should be used to determine the cost. The material costs for the compressors in this example were taken from *CACES Unit Price Book* for Region 2. Two 100 ton compressors at \$20,700 were used. The CACES number is 15655-2209. The cost for the evaporation and condensing tubing was \$100 each in the *CACES Unit Price Book* for Region 2. The total material cost would be 20700 x 2 compressors plus 100 x 2 tubes or \$41,600.

The normal equipment cost is for a maintenance truck with all required tools such as ladders and hand tools. The cost for the truck and equipment is usually based on task duration.

Task frequency determination is the most subjective area in the data base. Most frequencies must be determined by the judgment of professional maintenance personnel with many years of experience in performing the maintenance tasks. Some task frequencies are suggested by the manufacturer or professional organizations. Some frequencies, such as for interior wall painting, are set by regulations. There is very little published information in this area.

Table 5

## Task VT-6\*

No.	Reference	Work Unit Description	Hours	Units
1	VT-2	Pump down compressor	.38220	System
2	PWMU-1-8552	Remove and install bolts in intake and discharge valves	.17440	System
3	PWQ-1-8011	Remove and install intake and discharge valves	.14640	System
4	PWQ-4-I	Remove and install oil line and gages	.21918	System
5	PWMU-1-8552	Remove and install bolts in valve fittings	.17440	System
6	PWMU-1-8011	Remove and install valve fittings	.14640	System
7	PWMU-1-8010	Plug and unplug port openings	.10480	System
8	PWMU-1-8010	Pull away and push valve to compressor	.05240	System
9	PWMU-1-8000	Remove and install bolts for belt guard	.07120	System
10	PWMU-1-8021	Remove and install belt guard	.04900	System
11	PWMU-1-8553	Loosen and tighten motor base bolts	.06960	System
12	PWM-J-1-8010	Remove and install belts	.10480	System
13	PWMU-1-8552	Remove and install compressor base bolts	.08720	System
14	VT-10-XVI	Remove and install compressor	1.10240	System
15	PV; 4U-1-8011	Remove and install flywheel	.07320	System
16	VT-1	Charge open (central compression) air conditioning system	.62145 .37890	System System
17	PWV-1-II	Put compressor into operation	.95211	System
18	4211	Check operation of system	.29200	System
19	PWA-5-II	Material handling	.62154	System

\* VT-190 = 5.82358 hrs/system.

Table 6

## Task VT-270\*

No.	Reference	Work Unit Description	Hours	Units
1	PWV-15-IV	Remove Boiler Tube up to 20' long and 4" O.D. through manhole/handhole - leaving tube into sections	.28186	Tube
2	PWV-15-V	Install boiler tube up to 20' long and 4" O.D. 5 splices per box.	.61214	Tube

\* VT-270 = .89400 hrs/tube.

The data base has been reviewed by ten installation Directorates of Engineering and Housing (DEHs) and has been determined to accurately represent the resources required to perform the tasks. This data base serves as the foundation for the tables published in this report. The complete data base is too large to be duplicated in this report, but is available in the USACERL Special Report series titled *Maintenance Task Data Base for Buildings*.

The maintenance steering committee asked Forts Leonard Wood and Bragg to use the tasks to produce resource estimates for the past 3 years and then compare the predictions with their actual expenditures on a facility-by-facility basis. After this comparison was performed by both installations, the results were presented to the steering committee. Both installations stated that they were not performing all the tasks that they should, such as annual gutter cleaning and annual roof inspection. For the total installation, the tasks predicted an 8 to 10 percent higher total expenditure than the actual expenditure. This difference was due to the difference between the tasks predicted and actually performed. When comparisons were made at the task level, the task resource predictions were found to be accurate.

Two additional reviews were performed by two independent organizations that had related research work in the Army. The first review was for a research project to determine the maintenance requirements for historical family housing within the Military District of Washington, DC. The second review was a research project which needed an estimate of all resource requirements for the entire Army. This effort is known as the RPLANS research project. Both organizations reviewed the data base in detail and approved the resource requirements stated in the tasks. In addition, both used the data base within their research projects.

#### *Significance of the Task Data*

The task data presented in the previous section is based on average resources. Actual resource values for a particular project will vary as discussed below.

The labor hours reported will vary, depending on factors such as the actual productivity of the workers, the weather conditions, and the working space available. The labor hours given in this report are based on the average obtained from performing time and motion studies as tasks were performed.



The Washington, DC, material costs will vary, depending on factors such as the grade of material actually used, the manufacturer, and the quantity of material actually purchased. The figures given are the averages for all material prices found in the unit price books.

Task frequencies are the most subjective feature in the data base. High, average, and low frequency values are given to emphasize the variances. Average frequencies are used in developing the life-cycle analysis tables presented in the following sections.

### Component Summary Tables

A typical component summary is shown in Table 7 (Chapter 1). The development process is illustrated by using the labor resource for the hermetic chiller component.

All tasks related to the hermetic chiller component are listed individually in Tab. 7, with a task summary in Table 8. The task average frequency is used to project times of occurrence of M&R tasks for the first 25-year period as shown in Table 9.

Table 7  
Tasks for a 200T Water Cooled Chiller

TASK DATA FORM

Task Code: 0991511

Component: CHILLER WAT.COOL REC.20T System: COOLING GENERATION

Subsystem: EQUIPMENT

Task Description: M/R REPAIR HERMETIC CHILLER

Unit of Measure: COUNT

Persons per Team: 2 Task Duration: 5.2650 hr

Trade: REFRIG./AIR COND. Task Classification: 1

Labor Resources

Subtask Description	Labor Hrs
1.REPAIR CONTROLS	0.500000
2.REMOVE/REPLACE COMPRESSOR	5.800000
3.REM./REPLACE EVAPORATOR TUBE	0.900000
4.REMOVE/REPLACE CONDENSER TUBE	0.900000

Material Resources

Description	Quantity	Unit Cost
COMPRESSOR	1	4308.0000
EVAP. TUBE	1	100.0000
COND. TUBE	1	100.0000
		4508.0000

Zone	FREQUENCY OF OCCURRENCE		
	High	Average	Low
1	4.400	8.800	13.200
2	4.800	9.600	14.400
3	7.600	15.200	22.800
4	7.400	14.800	22.200
5	9.800	19.600	29.400
6	5.000	10.000	15.000
7	16.050	32.100	48.150
8	23.200	46.400	69.600
9	22.800	45.600	68.400
10	29.250	58.500	87.750
11	96.150	192.300	288.450

SUMMARY

Resources UOM	Direct	Indirect	Total
Labor Hours	8.100000	2.430000	10.530000
Material Cost \$	4508.000000		4508.000000
Equipment Hours			5.265000

Components in This Task: 0991510

Table 7 (Cont'd)

## TASK DATA FORM

Task Code: 0991512

Component: CHILLER WAT.COOL REC.20T System: COOLING GENERATION Subsystem: EQUIPMENT  
 Task Description: PM PREVENTIVE MAINTENANCE  
 Unit of Measure: COUNT  
 Persons per Team: 2 Task Duration: 11.3750 hours  
 Trade: REFRIG./AIR COND. Task Classification: 0

Labor Resources		Material Resources		
Subtask Description	Labor Hrs	Description	Quantity	Unit Cost
1.ANNUAL MAINTENANCE	16.000000			0.0000
2.RECURRING MAINTENANCE	1.000000			
3.SEASONAL SHUTDOWN	0.500000			

Zone	FREQUENCY OF OCCURRENCE		
	High	Average	Low
1	1.000	1.000	1.000
2	1.000	1.000	1.000
3	1.000	1.000	1.000
4	1.000	1.000	1.000
5	1.000	1.000	1.000
6	1.000	1.000	1.000
7	1.000	1.000	1.000
8	1.000	1.000	1.000
9	1.000	1.000	1.000
10	1.000	1.000	1.000
11	1.000	1.000	1.000

## SUMMARY

Resources UOM	Direct	Indirect	Total
Labor Hours	17.500000	5.250000	22.750000
Material Cost \$	0.000000		0.000000
Equipment Hours			11.375000

Components In This Task: 0991510

## TASK DATA FORM

Task Code: 0991513

Component: CHILLER WAT.COOL REC.20T System: COOLING GENERATION Subsystem: EQUIPMENT  
 Task Description: REPLACE REPLACE CHILLER  
 Unit of Measure: COUNT  
 Persons per Team: 4 Task Duration: 7.4750 hours  
 Trade: REFRIG./AIR COND. Task Classification: 1

Labor Resources		Material Resources		
Subtask Description	Labor Hrs	Description	Quantity	Unit Cost
1.REMOVE/REPLACE CHILLER	25.000000	CHILLER	1	9000.0000
				9000.0000

Zone	FREQUENCY OF OCCURRENCE		
	High	Average	Low
1	8.800	17.600	26.400
2	9.600	19.200	28.800
3	15.200	30.400	45.600
4	14.800	29.600	44.400
5	19.600	39.200	58.800
6	10.000	20.000	30.000
7	32.100	64.200	96.300
8	46.400	92.800	139.200
9	45.600	91.200	136.800
10	58.500	117.000	175.500
11	192.300	384.600	576.900

## SUMMARY

Resources UOM	Direct	Indirect	Total
Labor Hours	25.000000	6.900000	29.900000
Material Cost \$	9000.000000		9000.000000
Equipment Hours			7.475000

Components In This Task: 0991510

Table 8

## Task Summary Data for a 200T Water Cooled Chiller

Army Wide Task/Basic Task Structure List		Tree id: BF	Group id: B5		TWPMTH = Task Work Performance Method					
UM = Unit of Measure	TRD = Trade Index	UM	TRD	CLASS	HIGH FREQ	AVE FREQ	LOW FREQ	LABOR HOURS	MATERIAL COSTS	EQUIPMENT HOURS
0991550 CHILLER WATER COOLER RECP. 200T										
0991551	REPAIR HERMET. CHILLER	1	6	1	9.80	19.60	29.40	18.070000	41600.000000	4.517500
0991552	PREVENTATIVE MAINTENANCE	1	6	0	1.00	1.00	1.00	22.750000	.000000	11.375000
0991553	REPLACE CHILLER	1	6	1	19.60	39.20	58.80	74.100000	50000.000000	18.525000

Table 9

## 200T Chiller Spreadsheet - Labor Hours

Year	Task 1	Task 2	Task 3	Total	10% P.W.F.	P.W. LABOR HOURS
1		22.750000		22.750000	0.7164	16.298100
2		22.750000		22.750000	0.6512	14.814800
3		22.750000		22.750000	0.5920	13.468000
4		22.750000		22.750000	0.5382	12.244050
5		22.750000		22.750000	0.4893	11.131575
6		22.750000		22.750000	0.4448	10.119200
7		22.750000		22.750000	0.4044	9.200100
8		22.750000		22.750000	0.3676	8.362900
9		22.750000		22.750000	0.3342	7.603050
10	18.070000	22.750000		40.820000	0.3038	12.401116
11		22.750000		22.750000	0.2762	6.283550
12		22.750000		22.750000	0.2511	5.712525
13		22.750000		22.750000	0.2283	5.193825
14		22.750000		22.750000	0.2075	4.720625
15		22.750000		22.750000	0.1886	4.290650
16		22.750000		22.750000	0.1715	3.901625
17		22.750000		22.750000	0.1559	3.546725
18		22.750000		22.750000	0.1417	3.223675
19		22.750000		22.750000	0.1288	2.930200
20	0.000000	0.000000	74.100000	74.100000	0.1171	8.677110
21		22.750000		22.750000	0.1065	2.422875
22		22.750000		22.750000	0.0968	2.202200
23		22.750000		22.750000	0.0880	2.002000
24		22.750000		22.750000	0.0800	1.820000
25		22.750000		22.750000	0.0727	1.653925
				TOTAL		174.224401

The first task (Task 1 - 091551 - Repair Hermetic Chiller) has an average frequency in Zone 6 (AVE FREQ in Table 7) of 10 years; thus, it would be performed every ten years. The labor hours (18.0700 in Table 7) are listed for every ten years in the second column of Table 9.

The second task (Task 2 - 091552 - Preventative Maintenance) has an average frequency from Table 6 of 1.00 years; thus, it would be performed once each year. The labor hours (22.75000 in Table 7) are listed for each of the twenty-five years in the third column of Table 9.

The third task (Task 3 - 091553 - Replace Chiller) has an average frequency of twenty years; thus it would be performed every twenty years. The labor hours (74.1000 in Table 7) are listed for each of the 20 years in the fourth column of Table 9.

The total column in Table 9 is formed by adding the labor hours for tasks one through seven on a year-by-year basis. For example, during the tenth year, Tasks 1 and 2 are performed. The total labor hours would be  $18.0700 + 22.7500$  which equals 40.82.

The total column in Table 9 is shown in Table 2, Typical Component Summary for Chiller Water Coolers 0991550. The material costs and equipment hours have been developed in the same manner as explained for the labor hours.

The component data base is not printed in this report because of its size. Component summary data tables are published in the USACERL Special Report series titled *Maintenance Component Data Base for Buildings*.

### Life-Cycle Cost Analysis Tables

The main purpose of this report is to provide the designer with easy-to-use tables for the most common life-cycle cost analysis. USACE designers frequently perform life-cycle cost analysis for a 25-year period using a 7 or 10 percent discount rate shown in Tables 9 and 10. Two sets of summary tables have been generated for these cases and are given in Appendices A and B. Table 3 shows typical life-cycle cost analysis data.

Present Worth. The left four columns of Table 3, labeled "Present Worth of All 25-Year Maintenance and Repair Costs," were developed by multiplying the resources in Table 2 by the 7 or 10 percent present worth factors shown in Tables 10 and 11. The 25 individual year resource figures are totaled as shown for labor in Table 9.

The 1988 Washington, DC area labor and equipment rates were applied to this data to produce the totals shown in the column so titled. This column is given to provide one comparative cost figure for easy computation. This column can be used to quickly assess the ranking of various components' total 25-year LCC.

Annual and High Cost The right section of Table 3 is provided as input data for current life-cycle cost analysis computer programs. Two types of input are usually required. (1) a uniform or annual maintenance figure and (2) high-cost and replacement tasks that occur in specific years.

The data listed under the heading "Annual Maintenance and Repair" was generated by subtracting the present worth of the replacement task, if its occurrence is 25 years or less, and any high-cost tasks

Table 10

## 7 Percent Discount Factors From Date of Study\*

Years from BOD	End of Year	Accumulated End of Year
1	0.9346	0.9346
2	0.8734	1.8080
3	0.8163	2.6243
4	0.7629	3.3872
5	0.7130	4.1002
6	0.6663	4.7665
7	0.6227	5.3893
8	0.5820	5.9713
9	0.5439	6.5152
10	0.5083	7.0236
11	0.4751	7.4987
12	0.4440	7.9427
13	0.4150	8.3576
14	0.3878	8.7455
15	0.3624	9.1079
16	0.3387	9.4466
17	0.3166	9.7632
18	0.2959	10.0591
19	0.2765	10.3356
20	0.2584	10.5940
21	0.2415	10.8355
22	0.2257	11.0612
23	0.2109	11.2722
24	0.1971	11.4693
25	0.1842	11.6536

(Retention value at end  
of 25th year)

\*Date of Study (DOS) is the Beneficial Occupancy Date (BOD)

Table 11

## 10 Percent Discount Factors From Date of Study\*

Year from BOD	Factors		Accumulated
	Mid-Year	End of Year	
-3	0.9535		0.0
-2	0.8668		0.0
-1	0.7880		0.0
BOD			
1	0.7164		0.7164
2	0.6512		1.3676
3	0.5920		1.9596
4	0.5382		2.4978
5	0.4893		2.9871
6	0.4448		3.4319
7	0.4044		3.8362
8	0.3676		4.2038
9	0.3342		4.5380
10	0.3038		4.8418
11	0.2762		5.1180
12	0.2511		5.3691
13	0.2283		5.5973
14	0.2075		5.8048
15	0.1886		5.9935
16	0.1715		6.1650
17	0.1559		6.3209
18	0.1417		6.4626
19	0.1288		6.5914
20	0.1171		6.7086
21	0.1065		6.8150
22	0.0968		6.9118
23	0.0880		6.9998
24	0.0800		7.0799
25	0.0727		7.1526
Retention Value at End of 25th Year		0.0693	

\*Date of Study (DOS) is exactly 3 years before the Beneficial Occupancy Data (BOD).

from the present worth values given in the "Present Worth" section of the table. The remaining present worth figures for the low-cost task resources are divided by the cumulative 25-year present worth figure to arrive at the "uniform" or "annual" maintenance figures shown under the "Annual Maintenance and Repair" heading.

There are two types of tasks listed under the heading "Replacement and High-Cost Tasks." The first is the replacement task. The replacement task is shown on the same line as the component description. For example, the replacement task for 200T Chiller shown in Table 3 would occur when the chiller is 20 years old. Replacement would require the expenditure of 74.1 hours of labor, \$53,000 of material and 18.525 hours of equipment (maintenance truck). The second type of task is the high-cost task. Each high-cost task is listed on a separate line below the component description line. For example, there is one high-cost task for CW shown in Table 3. The high-cost task "Repair Hermetic Chiller" would occur when the chiller is ten years old. Replacement would require the expenditure of 18.07 hours of labor, \$44,096 of material, and 4.5175 hours of equipment (maintenance truck).



## 4 DATA BASE APPLICATION EXAMPLES

### Introduction

This chapter is divided into two sections. The first section defines the terminology used in the report and information needed to apply the labor hour, material cost and equipment hour resource data in this report. The second section gives specific examples using both the 10 percent present worth tables given in Appendix B and the 7 percent present worth tables given in Appendix A.

### Terminology

#### *Economic Studies*

Two basic types of economic studies are covered in this report: (1) general economic studies and (2) special energy-conservation studies.

General economic studies are conducted routinely as part of the design process for all military facilities. Such studies are normally performed for a 25-year period using a 10 percent discount rate and considering tasks to be performed mid-year. The Beneficial Occupancy Date (BOD) occurs approximately 3 years after the Date of Study (DOS) for most MILCON projects, and that is what is assumed in the example provided herein.

Special economic studies for the design of energy-consuming portions of a building are required by statute. Such studies analyze the use of extraordinary energy-saving design initiatives to conserve energy in new Federal facilities. The studies are normally performed for a 25-year period using a 7 percent discount rate considering all tasks to be performed at the end of the year. The BOD is normally assumed to occur on the DO3, in accordance with the provisions of the design criteria.

#### *Installation Labor Rates*

To perform an accurate cost analysis, the current shop effective labor rates and equipment rates per hour must be obtained from the installation. This information can be obtained from the DEH. Telephone numbers for the DEH are listed in the "Director of Engineering and Housing/Facilities, Engineer Assignments Roster" published yearly by the Office of the Chief of Engineers. Most installations maintain this information within their IFS data base; it can be obtained from the IFS data base administrator within the Management Engineering and Systems Branch.

#### *Initial Costs*

The initial construction costs can be obtained from the CACES Regional Unit Cost Manuals. The manuals are available from the district cost estimating section. When this manual is not available the cost estimates can be taken from other publications such as Means and Dodge.

#### *Geographical Location Adjustment Factors*

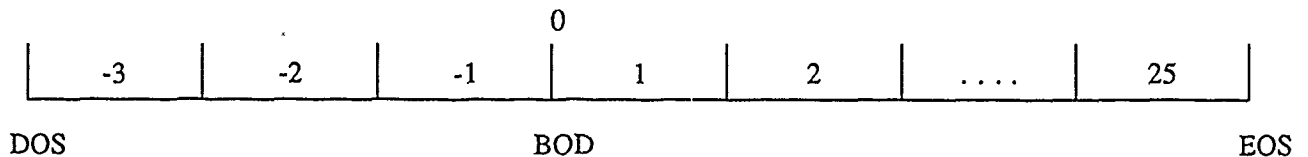
The Washington, DC-based material costs in the summary tables can be adjusted to a specific installation through the application of a geographical location adjustment factor. The factors are published in AR 415-17 and updates are available through the PAX computer system (Area Cost Factor Newsletter) and through the Engineering Improvement Recommendation System (EIRS) Bulletin. The 1988 set of factors is given in Appendix D.

### *Inflation Factors*

The material costs and Washington, DC, total costs presented in Appendices A and B are in July 1988 dollars. The costs need to be adjusted to the date of study by applying an approved inflation factor obtained from the District cost estimating office.

### *Timing of Costs*

Figure 2 shows the relationship of DOS, BOD, and the end of the study (EOS) which is assumed to be a 25-year comparison period:



**Figure 2. DOS, BOD, EOS relationship.**

In Appendix B, costs are discounted 3 years from time of occurrence to DOS. M&R costs occur throughout a year and are costed at mid-year in accordance with established criteria for MILCON design. The basic present worth factor formula is:

$$PWF(BA) = \frac{1}{(1 + DR)^{(B + BA - C)}} \quad [Eq 1]$$

where PWF = present worth factor

BA = building age

DR = discount rate

B = years from DOS to BOD

C = task placement, either .5 for mid-year, or 0 for end of year

The 10 percent present worth factor to bring costs from the mid-year of first year of occupancy to the DOS is  $1/(1.1)^{3.5} = 0.7164$  which is the first value in Table 10. If the DOS is not 3 years before BOD, Appendix B data can be adjusted. For example, if there is only 1 year between BOD and DOS (two less than the 3 years in the appendices), multiply this data by  $(1.1)^2$ . If there are 5 years (2 years more than the 3 years in the appendices), divide by  $(1.1)^2$ .

In Appendix A, the DOS and BOD are identical. M&R costs are assumed to occur at the end of the year as stipulated by regulations. The basic formula is:

$$PWF(BA) = \frac{1}{(1 + DR)^{(BA)}} \quad [Eq 2]$$

where PWF = present worth factor

BA = building age

DR = discount rate

### *Disposal Costs/Retention Value*

When disposal costs/retention value, is considered, it should be expressed as a percentage of the initial cost occurring at the end of the study period. The present worth of this value can be subtracted from the final net present worth.

### **Examples**

#### *Introduction*

This section contains one example for each of the basic uses for this life-cycle cost data. The first example demonstrates the procedures for calculating LCC for construction and maintenance and repair when the DOS is exactly 3 years before the BOD, the building is 25 years old at the end of the study, and installation resource costs are available from the installation. The second example demonstrates the procedures for calculating LCC for construction and maintenance and repair when resource costs are not available from the installation and Washington, DC, cost data is to be applied. Examples 3 and 4 show how to adjust data to cover the case for which BOD is not 3 years after DOS. Example 5 shows how to use the data to generate input for other computer programs. Example 6 demonstrates the use for a project containing an extraordinary energy-saving design initiative to conserve energy.

Each example is presented in five sections:

1. Statement of the problem
2. Identification of all installation-related information
3. Identification of all component-related information
4. Description of the present worth calculations
5. A typical calculation worksheet.

#### *Example 1: BOD 3 Years After DOS--200T Chiller*

Problem Statement. This example demonstrates all steps using a chiller water cooled Rec. 200T capacity. An apartment building for family housing is under design at OFFUTT AFB, NE. The DOS is July 1989. The projected BOD is July 1994. A 25-year life-cycle cost analysis using a 10 percent discount rate is required.

#### Installation-Related Data.

*Geographic Location Adjustment Factor.* The geographic location adjustment factor (LAF) can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system, as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or Area Cost Factor [ACF] Index) is 1.05.

*Inflation.* The cost data in Appendix B is expressed in July 1988 dollars. Since the date of the study is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

*Resource Rates.* The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures the designer called the OFFUTT AFB DEH-ME branch. The July 1989 rates of \$13.50 per hour for a technician and \$3.00 per hour for a maintenance truck were obtained. HVAC Zone: The HVAC zone of OFFUTT, NE is Zone 6, see Figure 1.

#### Component Information.

*Size.* The designer is considering a chiller, water cooled Rec. 200T capacity.

*Initial Costs.* The designer obtained a CACES unit price manual from the cost estimator. For the chiller, water cooled Rec. 200T capacity, a cost of \$53000.00 was obtained. (Note: if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

*Disposal Costs/Retention Value.* The average life of the chiller is 20 years, as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, it would still have 15 years of life remaining or  $15/20 = 75$  percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of \$53000.00, or \$39750.00.

Present Worth Calculations. Three factors must be considered when performing a present worth calculation: initial cost, maintenance costs, and retention value. Each factor is discussed below.

*Initial Costs.* The average construction project would normally be completed in one year. The contractor normally receives progress payments for work completed throughout the construction period. The initial cost of \$53000 is assumed to occur at the midpoint of construction during the year before BOD. The present worth factor at the midpoint for the year before BOD is given in the second column of Table 10 as 0.7880. The present worth of the initial cost would be the initial cost multiplied by the present worth factor 1 year before BOD or  $\$53000.00 \times 0.7880 = \$41764.00$

*25-Year Maintenance Cost.* The total 25-year maintenance cost is composed of three parts: labor, material, and equipment. Labor costs are equal to the labor hours obtained from Appendix B, multiplied by the installation labor hourly rate. This would be 174.22440 multiplied by a labor rate of \$13.50/hr, which is equal to \$2352.03.

$$\text{Labor} = 174.22440 \times \$13.50/\text{hr} = \$2352.03 \quad [\text{Eq } 3]$$

Material costs are equal to the material dollars in Washington, DC, obtained from Appendix B, multiplied by the geographic LAF from Appendix D and then multiplied by the inflation factor. This would be \$19602.66480 DC-based dollars multiplied by a geographic LAF of 1.05 and a cost escalation factor (CEF) of 1.02 which is equal to \$20994.45.

$$\text{Material} = \$1960.66480 \times 1.05 \times 1.02 = \$20994.45 \quad [\text{Eq } 4]$$

Equipment costs are equal to the equipment hours obtained from Appendix B, multiplied by the installation equipment hourly rate. This would be 83.57051 multiplied by an equipment rate of \$3.00/hr which is equal to \$250.72.

$$\text{Equipment} = 83.57051 \times \$3.00/\text{hr} = \$250.72 \quad [\text{Eq 5}]$$

The total maintenance cost would be the labor cost (\$2352.03) plus the material cost (\$20994.45) plus the equipment cost (\$250.72) or \$23597.19.

$$\text{Total} = \$2352.03 + \$20994.45 + \$250.72 = \$23597.20 \quad [\text{Eq 6}]$$

This total has already been discounted to the DOS since all figures on the left side of the table in Appendix B are expressed in terms of the DOS.

*Disposal Costs/Retention Value.* The DOS present worth for the retention value would be the expected retention value of \$39750.00 multiplied by the end-of-year present worth factor for the end of study year (EOS) obtained from Table 11, 0.06930, which produces a cost of \$2754.68.

*Total Life Cycle Cost for Construction and Maintenance and Repair.* The total life-cycle cost (LCC) per square foot for the DOS is the sum of the present worth costs for the initial cost of \$41764.00 plus the 25-year maintenance cost of \$23597.19 minus the retention value of \$2754.68.

$$\text{Total LCC} = \$41764.00 + \$23597.19 - \$2754.68 = \$62606.51 \quad [\text{Eq 7}]$$

The total dollar cost would be \$62606.51.

Calculation Sheet. A typical calculation sheet is shown in Table 12.

#### *Example 2: BOD 3 Years After DOS -- Washington, DC Rate Applied*

Problem Statement. This example demonstrates all steps using a chiller, water cooled Rec. 200T capacity. An apartment building for family housing is under design at OFFUTT AFB, NE. The DOS is July 1989. The projected BOD is July 1992, three years after DOS. A 25-year life-cycle cost analysis using a 10 percent discount rate is required.

The designer wishes to perform a rough cost estimate without calling the installation to obtain cost information. It should be understood that the installation's costs may vary significantly from the Washington, DC, costs and the rough calculations may be misleading. However, if the designer is going to compare several types of components such as water cool, hermetic, air cooled--all of which involve the identical trade such as an HVAC technician--the comparisons may be quite accurate.

#### Installation-Related Data.

*Geographic Location Adjustment Factor.* The geographic LAF can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or ACF Index) is 1.05.

Table 12

## Calculation Sheet - Example 1

	<u>Calculation Column</u>	<u>Subfactor Cost</u>	<u>Factor Cost</u>	<u>Total Cost</u>
<u>Initial Cost</u>				
Initial Cost	\$53000.00			
PWF for BOD-1	x <u>.7880</u>			
Initial cost			\$41764.00	
<u>25-Year Maintenance Cost</u>				
PW - Labor	174.2244			
Labor Rate	x <u>\$13.50/hr</u>			
Labor cost		\$2352.03		
PW - Material	\$19602.6648			
LAF	x 1.05			
CEF	x <u>1.02</u>			
Material cost		\$20994.45		
PW - Equipment	83.57051			
Equipment Rate	x <u>\$3.00/hr</u>			
Equipment cost		<u>\$250.72</u>		
Maintenance cost			\$23597.20	
<u>Disposal Costs/Retention Value</u>				
Initial Cost	\$53000.00			
Remaining Life	x .75			
PWF for EOS	x .06930			
Retention cost			- <u>\$2754.68</u>	
<u>TOTAL Life Cycle Cost</u>				\$62606.51

*Inflation.* The cost data in Appendix B is expressed in July 1988 dollars. Since the DOS is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

*Resource Rates.* The designer wishes to perform a rough calculation using the Washington, DC, labor and equipment rates rather than calling the installation. HVAC Zone: The HVAC Zone of OFFUTT AFB, NE is Zone 6, see Figure 1.

Component Information.

*Size.* The designer is considering a chiller, water cooled Rec. 200T capacity.

*Initial Costs.* The designer obtained a *CACES Unit Price Manual* from the cost estimator. For the chiller, water cooled Rec. 200T capacity component, a cost figure of \$53000.00 was obtained. (Note: if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

*Disposal Costs/Retention Value.* The average life of the chiller is 20 years, as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, it would still have 15 years of life remaining or  $15/20 = 75$  percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of \$53000.00 or \$39750.00.

Present Worth Calculations. Three factors need to be considered when performing a present worth calculation. Initial cost, maintenance costs, and retention value. Each factor is discussed below.

*Initial Costs.* The average construction project would normally be completed in one year. The contractor normally receives progress payments for work completed throughout the construction period. The initial cost of \$53000 is assumed to occur at the midpoint of construction during the year before BOD. The present worth factor at the midpoint for the year before BOD is given in the second column of Table 10 as 0.7880. The present worth of the initial cost would be the initial cost multiplied by the present worth factor 1 year before BOD or  $\$53000.00 \times 0.7880 = \$41764.00$

*25-Year Maintenance Cost.* The total 25-year maintenance cost for Fort Eustis can be calculated by taking the Washington, DC, total cost, \$23263.98, and multiplying by the location adjustment factor (1.05) producing a cost of \$24427.18.

*Disposal Costs/Retention Value.* The DOS present worth for the retention value would be the expected retention value of \$39750.00 multiplied by the end of year present worth factor for the EOD obtained from Table 11, 0.06930, which produces a cost of \$2754.67.

*Total LCC for Construction and Maintenance and Repair.* The total LCC per square foot for the DOS is the sum of the present worth costs for the initial cost of \$41764.00 plus the 25-year maintenance cost of \$24427.18 minus the retention value of \$2754.67.

$$\text{Total LCC} = \$41764.00 + \$24427.18 - \$2754.67 = \$63436.51 \quad [\text{Eq 13}]$$

The total dollar cost would be the LCC \$63436.51

Calculation Sheet. A typical calculation sheet is shown in Table 13.

#### *Example 3: DOS Less Than 3 Years Before BOD*

Perform the calculations as shown in Examples 1 through 3. The answers are lower than the actual DOS answers. The calculated values must be adjusted by multiplying by:

$$(1 + \text{DR})^{(3-A)} \quad [\text{Eq 14}]$$

where DR = discount rate

3 = years between DOS and BOD given in the tables

A = actual years between DOS and BOD

For example, using the answer of \$62606.51 in Example 1 and assuming 1 year between BOD and DOS with discount rate = 10% (0.10), the formula would be  $(1.10)^{(3-1)} = (1.1)^{(2)} = 1.21$ . The correct answer would be  $\$62606.51 \times 1.21 = \$75753.88$ .

#### *Example 4: DOS Greater Than 3 Years Before BOD*

Perform the calculation as shown in Examples 1 and 2. The answers are larger than the actual DOS answers. The calculated values must be adjusted by dividing by:

$$(1 + DR)^{(A-3)} \quad [\text{Eq 15}]$$

where DR = discount rate

3 = years between DOS and BOD given in the tables

A = actual years between DOS and BOD

For example, using the answer of \$62606.51 in Example 1 and assuming 5 years between BOD and DOS with  $d = 10\%$  (0.10), the formula would be  $(1.10)^{(5-3)} = (1.10)^2 = 1.21$ . The correct answer would be  $\$62606.51 \div 1.21 = \$51740.92$ .

*Example 5: Computer Input--BOD 3 Years After DOS (chiller, water cooled rec., 200T capacity)*

**Problem Statement.** This example demonstrates all steps using a chiller, water cooled Rec. 200T capacity. An apartment building for family housing is under design at OFFUTT AFB NE. The BOD is July 1992. The DOS is 3 years before BOD or July 1989. A 25-year LCC analysis using a 10 percent discount rate is required. A computer program, such as the Corps' LCCID, that requires an annual maintenance figure and high cost tasks will be used.

**Table 13**

**Calculation Sheet - Example 2**

	<u>Calculation Column</u>	<u>Subfactor. Cost</u>	<u>Factor Cost</u>	<u>Total Cost</u>
<u>Initial Cost</u>				
Initial Cost	\$53,000.00			
PWF for BOD	x <u>.7880</u>			
Initial Cost			\$41,764.00	
<u>25-Year Maintenance Cost</u>				
PW Total	\$23,263.98			
LAF	x <u>1.05</u>			
Maintenance Cost			\$24,427.18	
<u>Disposal Costs/Retention Value</u>				
Initial Cost	\$53,000.00			
Remaining Life				
PWF for EOS	x <u>.06930</u>			
Retention value			- \$3672.90	
Life Cycle cost				
TOTAL Life Cycle Cost				\$66,191.18



### Installation Related Data.

*Geographic Location Adjustment Factor.* The LAF can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or ACF Index) is 1.05.

*Inflation.* The cost data in Appendix B is expressed in July 1988 dollars. Since the DOS is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

*Resource Rates.* The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures the designer called the OFFUTT AFB DEH-MES branch. The July 1989 rates of \$13.50/hr for a HVAC Technician and \$3.00/hr for a roofing maintenance truck were obtained. HVAC Zone: The HVAC Zone of OFFUTT AFB, NE is Zone 6, see Figure 1.

### Component Information.

*Size.* The designer is considering a chiller, water cooled Rec. 200T capacity.

*Initial Costs.* The designer obtained a *CACES Unit Price Manual* from the cost estimator. By looking up the chiller, water cooled Rec. 200T capacity component, a cost of \$53000.00 was obtained. (Note: if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

*Disposal Costs/Retention Value.* The average life of the chiller is 20 years, as shown for the replacement table in Appendix B. At the end of the 25-year analysis period, the roof covering would still have 15 years of life remaining or  $15/20 = 75$  percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of \$53000.00, or \$39750.00.

*Data Entry Calculations.* Four factors need to be considered when performing a present worth calculation: initial cost, annual maintenance costs, high costs, and retention value. Each factor is discussed below.

*Initial Costs.* The initial cost of \$53,000 is estimated from CACES as discussed above.

*25-Year Maintenance Cost.* The total annual 25-year maintenance cost is composed of three parts: labor, material, and equipment. Annual labor costs are equal to the labor hours obtained from Appendix B, multiplied by the installation labor hourly rate. This would be 22.37754 multiplied by a labor rate of \$13.50/hr, which is equal to 302.10.

$$\text{Labor} = 22.37754 \times \$13.50/\text{hr} = \$302.10 \quad [\text{Eq 16}]$$

Annual material costs are equal to the material dollars in Washington, DC, obtained from Appendix B, multiplied by the geographic LAF from Appendix D, and then multiplied by the inflation factor. This would be \$0.000 DC-based dollars multiplied by a geographic LAF of 1.05 and a CEF of 1.02, or \$0. There is no annual material costs.

$$\text{Material} = 0 \quad [\text{Eq 17}]$$

Annual equipment costs are equal to the equipment hours obtained from Appendix B, multiplied by the installation equipment hourly rate. This would be 11.18877 multiplied by an equipment rate of \$3.00/hr, which is equal to \$33.57.

$$\text{Equipment} = 11.18877 \text{ hr/yr} \times \$3.00/\text{hr} = \$33.57/\text{yr} \quad [\text{Eq 18}]$$

The total annual maintenance cost would be the labor cost (\$302.10) plus the material cost (\$0), plus the equipment cost (\$33.57) or \$335.67.

$$\text{Total: } \$302.10 + \$0. + 33.57 = \$335.67 \quad [\text{Eq 19}]$$

*High Cost Task.* There is one high-cost task for chiller water cool Rec. 200T capacity. This task occurs in the 10th year. The resources required to perform this task are given below.

The labor resources are obtained by multiplying the labor hours, 18.07000, by the labor rate, \$13.50/hr, resulting in \$243.94.

$$\text{Labor} = 18.07000/\text{hr} \times \$13.50/\text{hr} = \$243.94 \quad [\text{Eq 20}]$$

The material resources are obtained by multiplying the material cost in DC base, \$44096, by the cost escalation factor, 1.02, and the location adjustment factor, 1.05, resulting in \$47226.82.

$$\text{Material} = \$44096 \times 1.02 \times 1.05 = \$47226.82 \quad [\text{Eq 21}]$$

Equipment resources are obtained by multiplying the equipment resources of 4.51750 by the equipment rate of \$3.00/hr resulting in \$13.55.

$$\text{Equipment} = 4.51750 \times \$3.00/\text{hr} = \$13.55 \quad [\text{Eq 22}]$$

Total cost for this one task would be the sum of the labor, material, and equipment costs.

$$\text{Total} = \$243.94 + \$47226.82 + \$13.55 = \$47484.31 \quad [\text{Eq 23}]$$

The total cost figure for computer entry is 4784.31 occurring in year 10.

*Replacement Task.* There is one replacement occurring in the 20th year. The resources required to perform this task are given below.

The labor resources are obtained by multiplying the labor hours 74.10000, by the labor rate, \$13.50/hr, resulting in \$1000.35.

$$\text{Labor} = 74.10000 \times \$13.50/\text{hr} = \$1000.35 \quad [\text{Eq 24}]$$

The material resources are obtained by multiplying the material cost in DC base, \$53000, by the cost escalation factor, 1.02, and the location adjustment factor, 1.05, resulting in \$56,763.00.

$$\text{Material} = \$53,000 \times 1.02 \times 1.05 = \$56,763.00 \quad [\text{Eq 25}]$$

Equipment resources are obtained by multiplying the equipment resources of 18.52500 by the equipment rate of \$3.00/hr resulting in \$55.58.

$$\text{Equipment} = 18.52 \times \$3.00/\text{hr} = \$55.58 \quad [\text{Eq 26}]$$

Total cost for this one task would be the sum of the labor, material, and equipment costs.

$$\text{Total} = \$1000.35 + \$56,763.00 + \$55.58 = \$57,818.93 \quad [\text{Eq 27}]$$

The total cost figure for computer entry is \$57,818.93 occurring in year 20.

*Disposal Costs/Retention Value.* The expected retention value is calculated as follows: at the end of the 25-year analysis period, the chiller would still have 15 years of life remaining or  $15/20 = 75$  percent of its useful life. The value is then 75 percent of the initial cost of \$53,000 or \$39,750.

The calculated values are entered into the computer and the computer performs the appropriate discounting.

Calculation Sheet A typical calculation sheet is shown in Table 14.

#### *Example 6: Extraordinary Energy-Saving Design Initiatives—200T Chiller*

Problem Statement. This example demonstrates all steps involved in using the summary tables in Appendix A for the conventional chiller, water cooled Rec. 200T capacity alternative. An apartment building for family housing is under design at Offutt AFB, NE. The designers are considering the use of a new-technology energy conserving, low maintenance cooler, in place of a conventional cooler, and will determine which is more cost effective on the basis of a life-cycle cost analysis. The DOS is July 1989. The analysis period is 25 years. In accordance with established criteria for energy-conservation studies, the BOD is assumed to occur on the DOS (July 1989); all costs are assumed to be occur at the end of the year in which they are projected to occur, and the discount rate for the present worth calculations is seven percent.

#### Installation Related Data.

*Geographic Location Adjustment Factor.* The geographic LAF can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or ACF Index) is 1.05.

*Inflation.* The cost data in Appendix A is expressed in July 1988 dollars. Since the DOS is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

Table 14  
Calculation Sheet - Example 5

ANNUAL MAINTENANCE

	<u>Calculation Column</u>	<u>Subfactor Cost</u>	<u>Factor Cost</u>	<u>Total Cost</u>
<u>Initial Cost</u>			\$53,000.00	
<u>25-Year Annual Maintenance</u>				
Labor hours	22.37754			
Labor Rate	x <u>\$13.50/hr</u>			
Labor cost			\$302.10	
Material	\$0			
AF	x 1.05			
CEF	x <u>1.02</u>			
Material cost			0	
Equipment	11.18877			
Equipment Rate	x <u>\$3.00/hr</u>			
Equipment cost			\$33.57	
<u>TOTAL Annual Maintenance</u>				\$335.67

HIGH COST TASK

Labor	18.07			
Labor Rate	x <u>\$13.50/hr</u>			
Labor cost			\$243.94	
Material	\$44096.00			
LAF	x 1.05			
CEF	x <u>1.02</u>			
Materials cost			\$47226.52	
Equipment	4.51750			
Equipment Rate	<u>\$3.00/hr</u>			
Equipment			<u>13.55</u>	
<u>TOTAL Cost for High Cost Task</u>				\$47484.32

REPLACEMENT Task

Labor	74.10000			
Labor Rate	x <u>\$13.50/hr</u>			
Labor cost			\$1000.35	
Material	\$53000			
LAF	x 1.05			
CEF	x <u>1.02</u>			
Materials cost			\$56,763.00	
Equipment	18.52500			
Equipment Rate	<u>\$3.00/hr</u>			
Equipment			\$55.58	
<u>TOTAL Maintenance Cost for Replacement Task</u>				\$57,818.92

Disposal Costs/Retention Value

Initial Cost	\$53,000.00			
Remaining Life	x <u>.75</u>			
Total/sq ft				
Square Feet				
Retention Value			\$39750.00	

*Resource Rates.* The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures, the designer called the OFFUTT AFB DEH-MES branch. The July 1989 rates of \$13.50 per hour for a HVAC Technician and \$3.00 per hour for a maintenance truck were obtained.

#### Component Information.

*Size.* The designer is considering a chiller, water cooled Rec. 200T capacity.

*Initial Costs.* The designer obtained a *CACES Unit Price Manual* from the cost estimator. For the chiller, a cost figure of \$53000.00 was obtained. (Note. if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

*Disposal Costs/Retention Value.* The average life is 20 years as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, the chiller would still have 15 years of life remaining or  $15/20 = 75$  percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of \$53000.00 or \$39750.00.

Present Worth Calculations. The following factors are considered in performing the present worth calculation: initial cost, maintenance costs, and retention value. Each factor is discussed below.

*Initial Costs.* The initial cost of \$53000.00 is assumed to occur on the BOD/DOS in accordance with established criteria for energy conservation studies.

*25-Year Maintenance Cost.* The total 25-year maintenance cost is composed of three parts: labor, material, and equipment. Labor costs are equal to the labor hours obtained from Appendix A multiplied by the installation labor hourly rate. This would be 287.56412 multiplied by a labor rate of \$13.50/hr which is equal to \$3,882.12.

$$\text{Labor} = 287.56412 \times \$13.50/\text{hour} = \$3,882.12 \quad [\text{Eq 24}]$$

Material costs are equal to the material dollars in Washington, DC, obtained from Appendix A multiplied by the geographic LAF from Appendix D and then multiplied by the inflation factor. This would be \$36,109.19680 based dollars multiplied by a geographic LAF of 1.05 and a CEF of 1.02, which is equal to \$38,672.94977

$$\text{Material} = \$36,109.19680 \times 1.05 \times 1.02 = \$38,672.95 \quad [\text{Eq 25}]$$

Equipment costs are equal to the equipment hours obtained from Appendix A multiplied by the installation equipment hourly rate. This would be 136.69896 multiplied by an equipment rate of \$3.00/hr, which is equal to \$410.10.

$$\text{Equipment} = 136.69896 \times \$3.00/\text{hr} = \$410.10 \quad [\text{Eq 26}]$$

The total maintenance cost would be the labor cost (\$3,882.12) plus the material cost (\$38,672.95) plus the equipment cost (\$410.10), or \$42,965.17.

$$\text{Total} = \$3,882.12 + \$38,672.95 + \$410.10 = \$42,965.17 \quad [\text{Eq 27}]$$

*Resource Rates.* The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures, the designer called the OFFUTT AFB DEH-MES branch. The July 1989 rates of \$13.50 per hour for a HVAC Technician and \$3.00 per hour for a maintenance track were obtained.

#### Component Information.

*Size.* The designer is considering a chiller, water cooled Rec. 200T capacity.

*Initial Costs.* The designer obtained a *CACES Unit Price Manual* from the cost estimator. For the chiller, a cost figure of \$53000.00 was obtained. (Note. if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

*Disposal Costs/Retention Value.* The average life is 20 years as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, the chiller would still have 15 years of life remaining or  $15/20 = 75$  percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of \$53000.00 or \$39750.00.

Present Worth Calculations. The following factors are considered in performing the present worth calculation: initial cost, maintenance costs, and retention value. Each factor is discussed below.

*Initial Costs.* The initial cost of \$53000.00 is assumed to occur on the BOD/DOS in accordance with established criteria for energy conservation studies.

*25-Year Maintenance Cost.* The total 25-year maintenance cost is composed of three parts: labor, material, and equipment. Labor costs are equal to the labor hours obtained from Appendix A multiplied by the installation labor hourly rate. This would be 287.56412 multiplied by a labor rate of \$13.50/hr which is equal to \$3,882.12.

$$\text{Labor} = 287.56412 \times \$13.50/\text{hour} = \$3,882.12 \quad [\text{Eq 24}]$$

Material costs are equal to the material dollars in Washington, DC, obtained from Appendix A multiplied by the geographic LAF from Appendix D and then multiplied by the inflation factor. This would be \$36,109.19680 based dollars multiplied by a geographic LAF of 1.05 and a CEF of 1.02, which is equal to \$38,672.94977

$$\text{Material} = \$36,109.19680 \times 1.05 \times 1.02 = \$38,672.95 \quad [\text{Eq 25}]$$

Equipment costs are equal to the equipment hours obtained from Appendix A multiplied by the installation equipment hourly rate. This would be 136.69896 multiplied by an equipment rate of \$3.00/hr, which is equal to \$410.10.

$$\text{Equipment} = 136.69896 \times \$3.00/\text{hr} = \$410.10 \quad [\text{Eq 26}]$$

The total maintenance cost would be the labor cost (\$3,882.12) plus the material cost (\$38,672.95) plus the equipment cost (\$410.10), or \$42,965.17.

$$\text{Total} = \$3,882.12 + \$38,672.95 + \$410.10 = \$42,965.17 \quad [\text{Eq 27}]$$

This total has already been discounted to the date of study since all figures on the left side of the table in the Appendix are expressed in terms of the DOS.

*Disposal Costs/Retention Value.* The DOS present worth for the retention value would be the expected retention value of \$39750.00 multiplied by the end of year present worth factor for the EOS of 0.1842 obtained from Table 10 which produces a value of \$7321.95.

*Total Life Cycle Cost for Construction and Maintenance and Repair.* The total LCC for the DOS is the sum of the present worth costs for the initial cost of \$53000.00 plus the 25-year maintenance cost of \$42,965.17 minus the retention value of \$7321.95.

$$\text{Total LCC} = \$53000.00 + \$42,965.17 - \$7321.95 = \$88,643.22 \quad [\text{Eq 28}]$$

The total dollar cost would be \$88,643.22.

Calculation Sheet. A typical calculation sheet is shown in Table 15.

Table 15

Calculation Sheet - Example 6

	<u>Calculation Column</u>	<u>Subfactor Cost</u>	<u>Factor Cost</u>	<u>Total Cost</u>
<u>Initial Cost</u>				
Initial Cost			\$53000.00	
<u>25 Year Maintenance Cost</u>				
PW - Labor	287.56412			
Labor Rate	x <u>\$13.50/hr</u>			
Labor cost		\$3882.12		
PW - Material	\$36,109.19680			
LAF	x 1.05			
CEF	x <u>1.02</u>			
Material cost		\$38672.12		
PW - Equipment	136.69896			
Equipment Rate	x <u>\$3.00/hr</u>			
Equipment cost		\$410.10		
Maintenance cost			\$42,965.17	
<u>Disposal Costs/Retention Value</u>				
Initial Cost	\$53000.00			
Remaining Life	x .75			
PWF for EOS	x .1842			
Retention value			- <u>\$7321.95</u>	
<u>TOTAL Life Cycle Cost</u>				\$88,643.22

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### LIST OF ACRONYMS

ACE	Assistant Chief of Engineers
AMS	Army Management System
APC	Account Processing Code
AR	Army Regulation
ARR	Annual Requirements Report
ASTM	American Society for Testing and Materials
BLAST	Building Loads Analysis and System Thermodynamics
BMAR	Backlog of Maintenance and Repair
BOD	Beneficial Occupancy Date
CA	Commercial Activities
CACES	Computer-Assisted Cost Estimating System
CONUS	Continental United States
DA	Department of the Army
DEH	Directorate of Engineering and Housing
DOD	Department of Defense
DOS	Date of Study
EA	Economic Analysis
EC	Engineering and Construction
EIRS	Engineering Improvement Recommendation System
EOS	End of Study
EPS	Engineered Performance Standards
HQ-IFS	Headquarters - Integrated Facilities
HQDA	Headquarters Department of the Army

## LIST OF ACRONYMS (Cont'd)

HVAC	Heating, Ventilating, and Air-Conditioning
IFS	Integrated Facilities System
IJO	Individual Job Order
LCC	Life-Cycle Cost
LCCID	Life-Cycle Cost in Design
M&R	Maintenance and Repair
MACOM	Major Command
MCA	Military Construction, Army
MRPM	Maintenance Resource Prediction Model
OCE	Office of the Chief of Engineers
PAX	Programming, Administration, and Execution System
PC	Personal Computer
PM	Preventive Maintenance
R&D	Research and Development
RAM	Random Access Memory
RMF	Recurring Maintenance Factor
RPI	Real Property Inventory
RPLANS	Real Property Planning System
RPMS	Real Property Management System
SO	Service Order
STANFINS	Standard Army Financial System
TB	Technical Bulletin
USACE	U.S. Army Corps of Engineers
USACERL	U.S. Army Construction Engineering Research Laboratory
USAEHSC	U.S. Army Engineering and Housing Support Center

**APPENDIX A:**

**LIFE-CYCLE COST ANALYSIS (7 PERCENT)**

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 16
COMPONENT DESCRIPTION	Zone: 1	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	Washington D.C. Total	labor	material	equipment	yr	labor	material	equipment	
NVAC													
NATURAL GAS SYSTEM													
EQUIPMENT													
GAS METER	CT	0.13209	33.30905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	
PIPE/FITTINGS, STEEL/IRON	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	316	1074.4500	1929.20000	537.22500	
PRESS. REDUCING VALVE, 5"	CT	0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.00000	59	0.26000	19.08000	0.26000	
PRESS. REDUCING VALVE, 2"	CT	0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.00000	59	0.26000	323.30000	0.31200	
FUEL OIL SYSTEM													
STORAGE SYSTEMS													
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	2.60000	164.30000	1.30000	
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000	
FUEL LEVEL METER	CT	0.72663	160.25384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000	
DISTRIBUTION SYSTEM	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	105	55.51000	1113.00000	27.75500	
PIPE/FITTINGS, COPPER													
LPG SYSTEM													
STORAGE SYSTEM													
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	5.20000	1574.10000	2.60000	
DISTRIBUTION SYSTEM	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	316	1074.4500	1929.20000	537.22500	
PIPE/FITTINGS, STEEL/IRON													
STEAM CENTRAL													
PRESS. RED. REG. SYSTEM	CT	1.74713	1.62958	1.74713	41.25	0.14992	0.13983	0.14992	113	7.35800	832.10000	3.67980	
STEAM CONVEYOR, 3800,000	CT	2.09716	1.62958	2.09716	49.19	0.17996	0.13983	0.17996	57	6.50000	147.34000	3.25000	
FLASH TANK, 24 GAL.	CT	1.84502	52.83599	0.82251	87.51	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000	
STEAM REG. VALVE 2"	CT	7.20265	0.00000	7.20265	163.36	0.61806	0.00000	0.61806	128	0.65000	1007.00000	0.65000	
COLD. METER, 300 G/HR.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	1.43000	20.22480	0.71500	
VALVES													
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	1.43000	20.22480	0.71500	
EQUIPMENT													
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	5.20000	175.96000	2.60000	
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	232.14000	2.60000	
FIRSED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	262.35000	2.60000	
SOLAR													
EQUIPMENT													
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	3.90000	349.80000	1.95000	
SOLAR STORAGE TANK, 1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	84	15.60000	2194.20000	7.80000	
PIPING SYSTEM	TF	0.36443	2.01396	0.30273	10.08	0.03127	0.17282	0.02598	26	41.70530	669.12500	20.85265	
PIPE/FITTINGS, PVC													
HEATING GENERATION													
EQUIPMENT													
BOILER GAS 250 KBTU/HR	CT	441.93294	0.00000	441.93294	10003.99	37.85036	0.00000	37.85036	113	65.00000	3169.40000	32.50000	
BOILER GAS 2000 KBTU/HR	CT	496.34005	0.00000	496.34005	11256.99	42.59114	0.00000	42.59114	113	184.60000	15032.92000	46.15000	
BOILER COAL 40 000 KBTU/HR	CT	1211.9368	0.00000	1211.9368	11588.67	43.84606	0.00000	43.84606	113	248.69000	38160.00000	62.17250	
BOILER COAL 100 000 KBTU/HR	CT	1436.7631	0.00000	1436.7631	26211.93	103.98820	0.00000	103.98820	113	20800.000	636000.00000	4160.0000	
BOILER OIL 250 KBTU/HR	CT	493.76666	0.00000	493.76666	11198.63	42.37031	0.00000	42.37031	113	65.00000	1590000.00000	8320.0000	
BOILER OIL 10 000 KBTU/HR	CT	560.42297	0.00000	560.42297	12710.39	48.09012	0.00000	48.09012	113	184.60000	3169.40000	16.25000	
BOILER GAS/OIL 2000 KBTU/HR	CT	617.98978	0.00000	617.98978	14016.01	53.02995	0.00000	53.02995	113	248.69000	38160.00000	46.15000	
BOILER GAS/OIL 20000 KBTU	CT	508.91582	0.00000	508.91582	11542.21	43.67027	0.00000	43.67027	113	184.60000	15032.92000	46.15000	
BOILER-PHEAT: COAL SPREAD.	CT	531.63956	0.00000	531.63956	12057.59	45.62020	0.00000	45.62020	113	248.69000	38160.00000	46.15000	
ASH HANDLING SYSTEM	CT	2362.1559	0.00000	2362.1559	53573.70	202.69753	0.00000	202.69753	15	182.00000	5618.00000	162.82500	
FUEL OIL EQUIPMENT	CT	3761.9786	0.00000	3761.9786	85321.67	322.81686	0.00000	322.81686	15	182.00000	5618.00000	162.82500	
FEED-WATER SUPPLY	CT	6.05966	0.00000	6.05966	127.74	0.19999	0.00000	0.19999	47	10.40000	212000.00000	45.50000	
CHEMICAL FEED SYSTEM	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	47	2.60000	302.10000	1.30000	
DEAERATOR	CT	227.23740	0.00000	227.23740	5153.74	19.49933	0.00000	19.49933	57	28.60000	2756.00000	9.53333	
BLOWOFF SYSTEM	CT	227.23740	0.00000	227.23740	4790.16	19.49933	0.00000	19.49933	57	28.60000	212000.00000	45.50000	
HOUSE FURN. GAS 25KBTU/HR	CT	46.96240	0.00000	46.96240	1065.11	4.02986	0.00000	4.02986	57	10.40000	147.34000	1.30000	

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	Zone: 1	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		Labor					D.C. Total					Labor					Labor				
		U#	material	equipment	U#	material	equipment	U#	material	equipment	U#	material	equipment	U#	material	equipment	U#	material	equipment		
HOUSE FURN. GAS 100KBTU/HR	CT	46.96240	0.00000	46.96240	CT	46.96240	0.00000	46.96240	CT	4.02986	0.00000	4.02986	57	20.80000	471.70000	10.40000	57	20.80000	471.70000		
HOUSE FURN. GAS 200KBTU/HR	CT	62.11156	0.00000	62.11156	CT	62.11156	0.00000	62.11156	CT	5.32982	0.00000	5.32982	57	20.80000	1766.10000	5.20000	57	20.80000	1766.10000		
HOUSE FURN. OIL 100KBTU/HR	CT	62.11156	0.00000	62.11156	CT	62.11156	0.00000	62.11156	CT	5.32982	0.00000	5.32982	57	20.80000	848.00000	5.20000	57	20.80000	848.00000		
HOUSE FURN. OIL 200KBTU/HR	CT	62.11156	0.00000	62.11156	CT	62.11156	0.00000	62.11156	CT	5.32982	0.00000	5.32982	57	20.80000	1358.60000	10.40000	57	20.80000	1358.60000		
HOUSE FURN. ELECT 100KBTU/HR	CT	25.73374	0.00000	25.73374	CT	25.73374	0.00000	25.73374	CT	1.04993	0.00000	1.04993	57	20.80000	1505.30000	10.40000	57	20.80000	1505.30000		
HOUSE FURN. ELECT 200KBTU/HR	CT	25.73374	0.00000	25.73374	CT	25.73374	0.00000	25.73374	CT	1.04993	0.00000	1.04993	57	20.80000	401.02000	5.20000	57	20.80000	401.02000		
CAST IRON RADIATOR 10 SECT	CT	22.73374	0.00000	22.73374	CT	22.73374	0.00000	22.73374	CT	1.04993	0.00000	1.04993	57	20.80000	791.27500	10.40000	57	20.80000	791.27500		
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	189	3.20000	175.98000	2.60000	189	3.20000	175.98000		
FINED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	75	3.20000	252.14000	2.60000	75	3.20000	252.14000		
EXPANSION TANK	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	189	3.47100	282.35000	2.60000	189	3.47100	282.35000		
STEAM CONVERTER, <300,000	CT	2.15407	1.62938	2.15407	CT	2.15407	1.62938	2.15407	CT	0.00093	0.00000	0.00093	189	3.47100	135.68000	1.73550	189	3.47100	135.68000		
FLASH TANK, 24 GAL.	CT	2.09716	1.62938	2.09716	CT	2.09716	1.62938	2.09716	CT	0.17996	0.00000	0.17996	57	6.50000	832.10000	3.67900	57	6.50000	832.10000		
STORAGE TANK, 24 DIM.	CT	3.21221	4.50065	3.21221	CT	3.21221	4.50065	3.21221	CT	0.27564	0.00000	0.27564	211	3.59595	147.34000	3.25000	211	3.59595	147.34000		
IND. FURN. GAS/OIL 500 MBU	CT	42.76598	0.00000	42.76598	CT	42.76598	0.00000	42.76598	CT	3.66977	0.00000	3.66977	126	65.00000	6784.62000	16.25000	126	65.00000	6784.62000		
IND. FURN. GAS/OIL 2000 MBTU	CT	76.93958	0.00000	76.93958	CT	76.93958	0.00000	76.93958	CT	6.60222	0.00000	6.60222	126	184.60000	13780.00000	46.15000	126	184.60000	13780.00000		
SURGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	63	5.20000	1574.10000	2.60000	63	5.20000	1574.10000		
DIST. PIPING SYSTEM	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	189	10.74450	41.34000	5.37225	189	10.74450	41.34000		
PIPE/FITTINGS, ST. & C.I.	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	113	5.55100	51.00720	2.75550	113	5.55100	51.00720		
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	105	241.80000	8034.80000	120.90000	105	241.80000	8034.80000		
PIPE AND FITTINGS, PVC	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	126	91.00000	954.00000	91.00000	126	91.00000	954.00000		
PIPE INSULATION	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	TF	0.00000	0.00000	0.00000	75	0.26000	17.91400	0.26000	75	0.26000	17.91400		
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	75	0.57200	94.05380	0.57200	75	0.57200	94.05380		
GATE VALVE, 2" - 3"	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	75	0.68900	17.91400	0.68900	75	0.68900	17.91400		
DRAIN VALVE	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.01594	0.00000	0.01594	75	0.68900	17.91400	0.68900	75	0.68900	17.91400		
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	57	1.43000	20.22480	0.71500	57	1.43000	20.22480		
PRESSURE REDUCER VALVE 2"	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000	23	7.80000	250.53100		
STEAM TRAP, F & T, <1"	CT	1.64502	52.83699	0.82251	CT	1.64502	52.83699	0.82251	CT	0.00000	0.00000	0.00000	38	1.30000	75.70520	1.30000	38	1.30000	75.70520		
PIPE INSULATION	TF	7.93811	11.19041	7.93811	TF	7.93811	11.19041	7.93811	TF	0.00000	0.00000	0.00000	113	91.00000	954.00000	91.00000	113	91.00000	954.00000		
CIRCULATION PUMP, < 1 HP	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	CT	0.00000	0.00000	0.00000	57	4.19900	371.00000	4.19900	57	4.19900	371.00000		
CIRCULATION PUMP, 5 HP	CT	1.43931	12.83086	1.43931	CT	1.43931	12.83086	1.43931	CT	0.12351	0.00000	0.12351	57	4.19900	1272.00000	2.09950	57	4.19900	1272.00000		
COND. SCVR, 10 - 15 GAL.	CT	16.66943	21.09382	16.66943	CT	16.66943	21.09382	16.66943	CT	1.43941	1.81007	1.43941	75	15.60000	1906.00000	7.80000	75	15.60000	1906.00000		
COOLING GENERATION EQUIPMENT	CT	55.13481	1958.80840	53.89425	CT	55.13481	1958.80840	53.89425	CT	3.54745	0.00000	3.54745	18	8.38500	1855.00000	4.19250	18	8.38500	1855.00000		
A/C DX PACKAGE 5T	CT	122.18032	7257.58510	118.15411	CT	122.18032	7257.58510	118.15411	CT	8.99532	0.00000	8.99532	18	20.80000	2392.23000	20.80000	18	20.80000	2392.23000		
REPAIR AIR CONDITIONER	CT	161.20151	21097.15859	150.61347	CT	161.20151	21097.15859	150.61347	CT	11.52921	0.00000	11.52921	18	23.40000	21200.00000	23.40000	18	23.40000	21200.00000		
A/C DX PACKAGE 20T	CT	24.46483	446.68470	24.46483	CT	24.46483	446.68470	24.46483	CT	0.10024	0.12650	0.10024	9	11.96000	1050.00000	11.96000	9	11.96000	1050.00000		
REPAIR AIR CONDITIONER	CT	24.90153	624.72230	24.90153	CT	24.90153	624.72230	24.90153	CT	0.10024	0.13650	0.10024	9	13.00000	1484.00000	13.00000	9	13.00000	1484.00000		
A/C WINDOW 1T	CT	60.04508	1254.21671	57.31573	CT	60.04508	1254.21671	57.31573	CT	0.62249	0.62249	0.62249	75	20.40000	2968.00000	6.50000	75	20.40000	2968.00000		
A/C WINDOW 2T	CT	125.02688	7573.76401	125.02688	CT	125.02688	7573.76401	125.02688	CT	9.22968	0.00000	9.22968	75	20.80000	7950.00000	6.80333	75	20.80000	7950.00000		
A/C PAD MOUNTED 20 TON	CT	274.70659	5968.24732	135.23761	CT	274.70659	5968.24732	135.23761	CT	21.91818	0.00000	21.91818	18	28.60000	10759.00000	20.80000	18	28.60000	10759.00000		
REPAIR AIR CONDITIONER	CT	342.72493	11843.51250	166.15400	CT	342.72493	11843.51250	166.15400	CT	28.38609	531.83055	28.38609	18	40.30000	19030.00000	9.94500	18	40.30000	19030.00000		
CHILLER AIR COOL RECIP.20T	CT	352.34168	27860.01710	167.44455	CT	352.34168	27860.01710	167.44455	CT	27.23935	0.00000	27.23935	18	72.80000	40280.00000	18.20000	18	72.80000	40280.00000		
CHILLER AIR COOL REC.50T	CT	152.74397	2187.43826	149.66661	CT	152.74397	2187.43826	149.66661	CT	11.78260	0.00000	11.78260	18	15.60000	3710.00000	5.20000	18	15.60000	3710.00000		
CHILLER AIR COOL REC.100T	CT	274.70659	5968.24732	135.23761	CT	274.70659	5968.24732	135.23761	CT	21.91818	0.00000	21.91818	18	28.60000	10759.00000	20.80000	18	28.60000	10759.00000		
REPAIR HERMETIC CHILLER	CT	342.72493	11843.51250	166.15400	CT	342.72493	11843.51250	166.15400	CT	28.38609	531.83055	28.38609	18	40.30000	19030.00000	9.94500	18	40.30000	19030.00000		
CHILLER AIR COOL RECIP. 5T	CT	152.74397	2187.43826	149.66661	CT	152.74397	2187.43826	149.66661	CT	11.78260	0.00000	11.78260	18	15.60000	3710.00000	5.20000	18	15.60000	3710.00000		
REPAIR HERMETIC CHILLER	CT	218.83896	3992.03844	108.39369	CT	218.83896	3992.03844	108.39369	CT	17.10378	0.00000	17.10378	18	22.17157	10857.80000	8.55189	18	22.17157	10857.80000		
CHILLER AIR COOL REC. 10T	CT	280.20494	7378.74957	137.98678	CT	280.20494	7378.74957	137.98678	CT	22.17157	0.00000	22.17157	18	22.17157	10857.80000	8.55189	18	22.17157	10857.80000		
CHILLER AIR COOL REC. 15T	CT	272.95325	5621.90127	134.26477	CT	272.95325															

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				Replacement and High Costs Tasks				PAGE 18	
PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)										Annual Maintenance and Repair				Annual Maintenance and Repair					
By Resources										Washington		D.C. Total		labor		material		equipment	
By Resources										labor		material		equipment		labor		material	
By Resources										labor		material		equipment		labor		material	
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See NOTES on the last page of this table for Explanations of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 21
Zone: 2	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
HVAC	NATURAL GAS SYSTEM												
	EQUIPMENT												
	GAS METER	CT 0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	
	PIPING SYSTEM												
	PIPE/FITTINGS, STEEL/IRON	TF 2.26602	4.06858	1.13301	51.84	0.19445	0.34914	0.09722	141	1074.4500	1929.20000	537.22500	
	PRESS. REDUCING VALVE, 2"	CT 0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.02260	26	0.26000	19.08000	0.26000	
	FUEL OIL SYSTEM												
	STORAGE SYSTEMS												
	OIL STORAGE TANK, 275 GAL.	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	2.60000	164.30000	1.30000	
	OIL FILTER	CT 1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000	
	FUEL LEVEL METER	CT 0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000	
	DISTRIBUTION SYSTEM												
	PIPE/FITTINGS, COPPER	TF 0.05104	0.02345	0.05104	1.18	0.00438	0.00201	0.00438	47	55.51000	1113.00000	27.75500	
	LPG SYSTEM												
	STORAGE SYSTEM												
	LPG STORAGE TANK, 1000 GAL	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	1574.10000	2.60000	
	DISTRIBUTION SYSTEM												
	PIPE/FITTINGS, STEEL/IRON	TF 2.26602	4.06858	1.13301	51.84	0.19445	0.34914	0.09722	141	1074.4500	1929.20000	537.22500	
	STEAM CENTRAL												
	PRESS. RED. /REG. SYSTEM	CT 6.49221	6.15704	6.49221	153.40	0.55710	0.52838	0.55710	49	7.35800	832.10000	3.67900	
	STEAM CONVERTOR, <300,000	CT 6.75682	32.21147	6.15817	183.50	0.47706	0.43518	0.47706	24	6.50000	147.34000	3.25000	
	FLASH TANK, 24 GAL	CT 5.98026	192.08212	2.99013	318.15	0.00000	0.00000	0.00000	10	7.80000	250.53100	3.50000	
	STEAM REG. VALVE 2"	CT 7.20265	0.00000	7.20265	163.35	0.61806	0.00000	0.61806	56	0.65000	1007.00000	0.65000	
	COND. METER, <300 #/HR.												
	VALVES												
	RADIATOR VALVE 1"	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	1.43000	20.22480	0.71500	
	EQUIPMENT												
	CAST IRON RADIATOR 10 SECT	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	5.20000	175.96000	2.60000	
	BASEBOARD RADIATOR 10 FT	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	232.14000	2.60000	
	FINED RADIATOR, WALL 10 F	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	282.55000	2.60000	
SOLAR	EQUIPMENT												
	SOLAR PANEL, 3' X 8'	CT 445.09438	208.97322	445.09438	10303.71	38.19372	17.93207	38.19372	49	65.00000	3169.40000	32.50000	
	SOLAR STORAGE TANK, 1000GAL	CT 500.34149	403.79077	500.34149	11751.54	42.93450	34.65013	42.93450	49	184.60000	15032.92000	46.15000	
	PIPING SYSTEM	CT 514.96587	2385.60462	514.96587	14065.03	44.18842	204.70957	44.18842	49	248.69000	38160.00000	62.17250	
	PIPE/FITTINGS, PVC	CT 1211.83568	0.00000	814.17140	26211.93	103.98820	0.00000	69.86437	49	20300.000	635000.00000	4160.0000	
	HEATING GENERATION	CT 1458.7681	0.00000	937.63705	31417.24	125.17747	0.00000	80.45900	49	41600.000	1590000.00000	8320.0000	
	BOILER GAS 250 KBTU/HR	CT 504.66420	145.71826	504.66420	11591.50	43.30543	12.50414	43.30543	49	65.00000	3169.40000	16.25000	
	BOILER OIL 250 KBTU/HR	CT 565.19064	162.51776	565.19064	12964.24	48.49923	12.50414	48.49923	49	184.60000	15032.92000	46.15000	
	BOILER OIL 10,000 KBTU/HR	CT 432.75745	162.51776	432.75745	12866.66	48.49923	12.50414	48.49923	49	184.60000	15032.92000	46.15000	
	BOILER GAS/OIL 2000 KBTU/H	CT 514.70514	250.16058	514.70514	11923.69	44.16705	13.94571	44.16705	49	184.60000	15032.92000	46.15000	
	BOILER GAS/OIL 20000 KBTU	CT 537.68420	4507.42247	537.68420	16702.10	46.13890	386.70360	46.13890	49	184.60000	15032.92000	46.15000	
	BOILER PREHEAT COAL SPREAD.	CT 3362.4312	1950.05126	3362.4312	55407.35	323.07832	42.76447	323.07832	49	184.60000	15032.92000	46.15000	
	ASH HANDLING SYSTEM	CT 3765.0243	569.50641	3765.0243	85955.38	323.07832	42.76447	323.07832	49	184.60000	15032.92000	46.15000	
	FUEL OIL EQUIPMENT	CT 7.85648	57.37400	7.85648	223.77	0.63643	0.00000	0.63643	24	2.60000	302.10000	1.30000	
	CHEMICAL FEED SYSTEM	CT 8.03350	71.25718	8.03350	253.35	0.63643	0.00000	0.63643	24	2.60000	302.10000	1.30000	
	FEED-WATER SUPPLY	CT 238.91342	507.65530	238.91342	5688.18	19.19111	0.00000	19.19111	24	20.60000	2756.00000	9.33333	
	GENERATOR	CT 127.47316	0.00000	113.73160	4700.50	10.51499	0.00000	9.75849	32	260.00000	21200.00000	65.00000	
	BLOWOFF SYSTEM	CT 0.47809	127.14093	0.47809	37.24	0.00000	0.00000	0.00000	24	2.60000	127.34000	1.30000	
	HOUSE FURN. GAS 25KBTU/HR	CT 49.18939	184.41093	49.18939	1276.96	4.05658	8.49530	4.05658	24	10.40000	355.10000	5.20000	

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION

Zone: 2

COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7x)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
	By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
HOUSE FURN GAS 100-200/HR	CT 51.12154	205.35253	49.20586	1358.66	4.03799	10.16556	4.03799	24	20.80000	471.70000	10.40000	
HOUSE FURN GAS 200-400/HR	CT 51.12154	405.70506	99.41172	1626.61	4.03799	12.38298	4.03799	24	20.80000	1786.10000	10.40000	
HOUSE FURN OIL 250-500/HR	CT 64.11556	206.81632	63.15772	1747.89	5.33740	12.06620	5.33740	24	20.80000	848.00000	5.20000	
HOUSE FURN OIL 100-200/HR	CT 64.11556	403.60234	64.11556	1895.06	5.33740	15.16051	5.33740	24	20.80000	1358.49000	10.40000	
HOUSE FURN OIL 200-400/HR	CT 64.11556	473.39812	64.11556	1944.86	5.33740	15.40673	5.33740	24	20.80000	1595.49000	10.40000	
HOUSE FURN ELECT 200-400/HR	CT 25.63844	177.82708	24.60040	756.24	2.03566	5.75932	2.03566	24	20.80000	601.02000	5.20000	
HOUSE FURN ELECT 100-200/HR	CT 27.55612	235.03650	25.63844	833.03	2.03566	8.20372	2.03566	24	20.80000	751.27500	10.40000	
HOUSE FURN ELECT 200-400/HR	CT 27.55612	299.89732	25.63844	918.69	2.03566	10.65512	2.03566	24	20.80000	954.00000	10.40000	
CASED IRON RADIATOR 10 SECT	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	5.20000	175.94000	2.60000	
BASEBOARD RADIATOR, WALL 10 F	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	232.11000	2.60000	
EXPANSION TANK	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	262.35000	2.60000	
STEAM CONVERTOR, <300,000	CT 0.04074	6.15705	0.94074	158.52	0.57647	0.5884	0.57647	49	7.58000	832.10000	3.67900	
FLASH TANK, 26 GAL.	CT 6.71795	32.21167	6.15817	103.54	0.47765	1.43518	0.47765	24	6.50000	147.34000	3.25000	
STORAGE TANK, DIN	CT 6.75602	13.35950	9.76170	123.58	0.83766	1.18929	0.83766	24	3.59395	346.62000	1.79698	
IND. FUR. GAS/OIL 500 HBU	CT 9.76170	226.52313	40.44298	2274.25	3.95096	19.43804	3.95096	56	65.00000	6784.00000	16.25000	
IND. FURN GAS/OIL 2000 HBU	CT 46.04269	470.95259	79.51059	2274.25	6.82284	40.47261	6.82284	56	184.60000	13780.00000	46.15000	
SURGE TANK, 1000 GAL	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	5.20000	1574.10000	2.60000	
DIST. PIPING SYSTEM	TF 0.05937	0.03124	0.05937	1.39	0.00514	0.00263	0.00514	81	10.74450	41.34000	5.37225	
PIPE/FITTINGS, ST. & C.I.	TF 0.05937	0.02685	0.05937	1.35	0.00514	0.00263	0.00514	49	5.55100	51.00720	2.77550	
PIPE/FITTINGS, COPPER	TF 0.05937	1.12547	0.05937	6.26	0.01943	0.00958	0.01943	241	91.00000	8034.80000	120.99000	
PIPE AND FITTINGS, PVC	TF 0.26526	1.63050	0.26526	7.65	0.02276	0.13991	0.02276	56	0.00000	954.00000	0.00000	
PIPE INSULATION	CT 0.47867	0.14075	0.47867	11.00	0.04107	0.01210	0.04107	32	0.26000	17.91400	0.26000	
GATE VALVE, 3/2" - 1 1/2"	CT 0.11236	0.28190	0.11236	2.03	0.00964	0.02419	0.00964	32	0.57200	94.03300	0.57200	
DRAIN VALVE	CT 0.74233	3.09603	0.74233	19.93	0.03370	0.26567	0.03370	32	0.68900	17.91400	0.68900	
RADIATOR VALVE 1"	CT 0.26341	3.72541	0.13170	9.23	0.00000	0.00000	0.00000	24	1.43000	20.22400	0.71500	
PRESSURE REDUCE VALVE 2"	CT 5.90026	192.03212	2.99013	310.15	0.00000	0.00000	0.00000	10	7.80000	250.53100	3.90000	
STEAM TRAP F & T, <1"	CT 8.78477	54.09565	0.78477	254.12	0.71851	2.45305	0.71851	16	1.30000	75.70520	1.30000	
PIPE INSULATION	TF 0.35311	2.17047	0.35311	10.18	0.03030	0.18625	0.03030	49	91.00000	954.00000	91.00000	
CIRCULATION PUMP, <1 HP	CT 2.54492	72.77604	2.54492	130.49	0.15201	0.38001	0.15201	24	4.19900	371.00000	2.09950	
CIRCULATION PUMP, 5 HP	CT 2.54492	267.39936	2.54492	323.03	0.15201	0.38001	0.15201	24	4.19900	1272.00000	2.09950	
COND. CURR, 10 - 15 GAL.	CT 19.07571	66.07391	19.07571	519.92	1.71412	5.73048	1.71412	32	15.40000	1908.00000	7.80000	
COOLING GENERATION	CT 54.21640	1796.96251	53.13305	3023.12	3.55916	0.00000	3.55916	19	8.38500	1855.00000	4.19250	
A/C DX PACKAGE 5T	CT 121.02059	6638.40032	117.50463	9371.90	9.02502	0.00000	9.02502	19	20.41000	2592.23000	20.80000	
REPAIR AIR CONDITIONER	CT 159.02297	19331.87508	149.77677	22908.93	11.56728	0.00000	11.56728	19	29.80000	3618.53300	20.80000	
A/C DX PACKAGE 20T	CT 24.12432	407.90506	24.12432	955.04	0.09793	0.13332	0.09793	10	13.90000	1080.00000	13.90000	
REPAIR AIR CONDITIONER	CT 24.52301	570.44546	24.52301	1128.63	0.09793	0.13332	0.09793	10	13.90000	1484.00000	13.90000	
A/C WINDOW 1T	CT 59.90413	1145.55309	57.41238	2496.21	9.22968	0.00000	9.22968	10	24.10000	2968.00000	6.50000	
A/C WINDOW 2T	CT 123.50640	6914.50925	123.50640	9715.63	21.99055	0.00000	21.99055	10	28.80000	3750.00000	6.80333	
A/C PAD HTD, 4T	CT 273.76930	5382.51994	135.03713	11147.67	11.82151	0.00000	11.82151	10	15.60000	10759.00000	7.15000	
REPAIR AIR CONDITIONER	CT 341.38711	10722.35350	166.00869	17903.80	28.40997	497.02053	14.02187	19	40.30000	5119.80000	9.24500	
CHILLER HERMETIC CHILLER	CT 349.78511	25306.11670	167.05744	32654.55	27.32929	0.00000	27.32929	19	40.30000	19080.00000	10.07500	
CHILLER AIR COOL REC. 50T	CT 151.90426	1976.99222	149.21690	5413.50	11.82151	0.00000	11.82151	10	24.57000	40280.00000	18.20000	
CHILLER AIR COOL REC. 100T	CT 217.84239	3615.42468	108.02541	8204.68	17.16025	0.00000	17.16025	10	28.80000	29309.00000	6.14250	
CHILLER AIR COOL REC. 5T	CT 279.11087	6745.86809	137.70788	12623.61	22.24477	0.00000	22.24477	10	28.80000	3710.00000	19.89000	
CHILLER AIR COOL REC. 10T	CT 272.31026	7894.03738	134.22359	10628.16	22.24477	0.00000	22.24477	10	28.80000	3710.00000	19.89000	
CHILLER AIR COOL REC. 15T												
CHILLER AIR COOL REC. 20T												

See notes on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	UN	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (D= 7X)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			REPLACEMENT AND HIGH COST TASKS		
		BY Resources			Annual Maintenance and Repair			yr		
		labor	material	equipment	Washington	D.C. Total	labor	material	equipment	labor
Zone: 2										
REPAIR HERMETIC CHILLER	CT	280.04572	9819.81800	135.78477	15725.20		22.24477	0.00000	11.12239	10.53000
CHILLER WAT.COOL REC.50T										4778.48000
REPAIR HERMETIC CHILLER	CT	287.56412	21747.61720	136.69896	27786.80		22.24477	0.00000	11.12239	10.53000
CHILLER WAT.COOL REC.100T										15030.00000
REPAIR HERMETIC CHILLER	CT	240.33234	3093.67360	118.02249	8155.50		19.70251	0.00000	9.85126	10.53000
CHILLER WAT.COOL REC.10T										11236.00000
REPAIR HERMETIC CHILLER	CT	287.56412	35109.19680	136.69896	42148.38		22.24477	0.00000	11.12239	10.53000
CHILLER WAT.COOL REC.200T										29044.00000
REPAIR HERMETIC CHILLER	CT	402.30597	21115.53507	197.16195	29584.93		32.41381	0.00000	16.20691	10.53000
CHILL. HERMETIC CENT. 100T										53000.00000
REPAIR CHILLER	CT	411.19150	4790.00000	199.20725	58446.57		32.41381	0.00000	16.20691	10.53000
CHILL. HERMETIC CENT. 300T										37899.00000
REPAIR CHILLER	CT	428.25101	134164.12039	203.62041	143158.08		32.41381	0.00000	16.20691	10.53000
CHILL. HERMETIC CENT. 900T										66569.06000
REPAIR CHILLER	CT	1024.6135	49790.00000	506.00030	71377.51		04.53014	0.00000	42.26507	10.53000
CHILL. OPEN CENT. 300T										199283.18000
REPAIR CHILLER	CT	428.25101	134164.12039	203.62041	143158.08		32.41381	0.00000	16.20691	10.53000
CHILL. OPEN CENT. 900T										66569.06000
REPAIR CHILLER	CT	63.31053	22167.81297	227.20833	31920.32		37.49033	0.00000	18.74917	10.53000
CHILL.DBL.DNDL. HERH.100T										41340.00000
REPAIR CHILLER	CT	401.05624	66156.91430	233.95678	76292.10		37.49033	0.00000	18.74917	10.53000
CHILL.DBL.DNDL. HERH.300T										6740.00000
REPAIR CHILLER	CT	516.44759	137693.42749	246.71854	148543.33		37.49033	0.00000	18.74917	10.53000
CHILL.DBL.DNDL. HERH.900T										13520.00000
REPAIR CHILLER	CT	1317.3157	13465.90560	654.45886	41221.56		111.22307	0.00000	55.61194	10.53000
CHILL. ONE STG. ABS. 100T										632.00000
REPAIR CHILLER	CT	222.32561	19765.77760	104.44441	24430.90		16.39758	0.00000	8.19879	10.53000
CHILL. ONE STG. ABS. 300T										632.00000
REPAIR CHILLER	CT	238.78569	33187.07360	108.55943	38186.01		16.39758	0.00000	8.19879	10.53000
CHILL. ONE STG. ABS. 900T										632.00000
REPAIR CHILLER	CT	225.01297	21409.20160	105.11625	26128.83		16.39758	0.00000	8.19879	10.53000
CHILL. TWO STG. ABS. 300T										632.00000
REPAIR CHILLER	CT	229.82073	36391.70340	102.98521	41198.21		15.62780	0.00000	7.81390	10.53000
CHILL. TWO STG. ABS. 900T										632.00000
REPAIR CHILLER	CT	34.21956	619.22550	32.57064	1390.05		2.65341	0.00000	2.65341	10.53000
AIR COOLED CONDENSER 5T										27.58923
REPAIR CONDENSER	CT	38.45564	1269.64150	17.97350	2076.35		2.65341	0.00000	2.65341	10.53000
AIR COOLED CONDENSER 20T										33.13228
REPAIR CONDENSER	CT	62.77786	2569.50598	28.56221	3603.82		4.41674	0.00000	2.20837	10.53000
AIR COOLED CONDENSER 50T										154.32334
REPAIR CONDENSER	CT	68.43130	5632.17942	29.97557	7061.14		4.41674	0.00000	2.20837	10.53000
AIR COOLED CONDENSER 100T										154.32334
REPAIR CONDENSER	CT	71.93446	2660.55945	31.72715	3963.37		4.41735	0.00000	2.20837	10.53000
COOLING TOWER 50T										71.87059
REPAIR TOWER	CT	182.43644	4486.91905	86.50702	8317.60		14.03786	0.00000	7.01893	10.53000
COOLING TOWER 100T										149.34720
REPAIR TOWER	CT	218.27931	7675.43735	102.07285	12254.17		16.30501	0.00000	8.15251	10.53000
COOLING TOWER 300T										17.69049
REPAIR TOWER	CT	252.79043	17375.99335	114.79220	22646.78		17.69049	0.00000	8.15251	10.53000
EVAPORATIVE CONDENSER 20T										47.21034
REPAIR CONDENSER	CT	115.41112	1886.99160	54.40872	4309.35		8.77169	0.00000	4.38584	10.53000
EVAPORATIVE CONDENSER 100T										13.93358
REPAIR CONDENSER	CT	198.67706	13095.00369	38.24406	15340.79		13.93358	0.00000	6.96788	10.53000
EVAPORATIVE CONDENSER 300T										134.78097
REPAIR CONDENSER	CT	109.66440	4508.70471	8.80047	552.92		0.00350	0.00000	0.00350	10.53000
EXPANSION TANK										3.14966
REPAIR TANK	CT	9.40074	346.70471	8.80047	438.47		0.72347	0.00000	0.72347	10.53000
REFRIG. FAN COIL 1T										11.63299
REPAIR FAN COIL	CT	9.40074	346.70471	8.80047	438.47		0.72347	0.00000	0.72347	10.53000
REFRIG. FAN COIL 3T										41.34000
REPAIR FAN COIL	CT	9.40074	346.70471	8.80047	438.47		0.72347	0.00000	0.72347	10.53000
REFRIG. FAN COIL 9T										41.34000
REPAIR FAN COIL	CT	9.40074	346.70471	8.80047	438.47		0.72347	0.00000	0.72347	10.53000
PIPING SYSTEM										10.74450
PIPE/FITTINGS ST. & C.I.										5.35100
PIPE/FITTINGS COPPER										24.168000
PIPE AND FITTINGS PVC										8321.00000
GATE VALVE, 3/8" - 1 1/2"										17.91400
GATE VALVE, 2" - 3"										94.05380
DRAIN VALVE										0.68900
PIPE INSULATION										901.00000
CIRCULATING PUMP < 1 HP										371.00000

See notes on the last page of this table for explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

Zone: 2	COMPONENT DESCRIPTION	MAINTENANCE AND REPAIR COSTS (d = 7%)				ANNUAL MAINTENANCE AND REPAIR COSTS				HIGH COST REPAIR AND REPLACEMENT PLUS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		Labor	Material	Equipment	D.C. Total	Labor	Material	Equipment	Yr	Labor	Material	Equipment	Yr
CT	5 TON CHILLER ACH RECIP	4.64499	267.39936	3.20823	358.15	0.15201	2.84006	0.15201	24	15.60000	1272.00000	7.80000	
CT	HEAT/COOL GENERATION												
CT	EQUIPMENT												
CT	MULTI-ZONE 6500 CFM	96.65971	3279.48046	55.51050	5340.05	6.99816	67.83537	4.43932	13	36.40000	5997.48000	9.10000	
CT	MULTI-ZONE 10,000 CFM	99.33721	4306.44214	56.18497	6421.71	9.69216	82.81119	4.43932	13	42.90000	8050.70000	10.72500	
CT	MULTI-ZONE 25,000 CFM	117.22760	8152.48290	63.73965	10620.04	7.37425	156.89315	4.70835	13	75.40000	15359.40000	18.45000	
CT	MULTI-ZONE 50,000 CFM	134.01900	13342.51055	71.22467	16181.12	7.73035	172.53780	5.17435	13	105.30000	27105.40000	26.32500	
CT	DUAL DUCT 6500 CFM	91.23192	2152.40071	54.26809	4103.28	7.02011	52.84416	4.43932	13	36.40000	5997.48000	9.10000	
CT	DUAL DUCT 10,000 CFM	95.19874	4307.37514	55.45469	5369.25	6.87279	82.92327	4.37684	13	42.90000	8050.70000	10.72500	
CT	DUAL DUCT 25,000 CFM	97.89324	8109.61091	63.09917	10566.37	7.24889	148.92050	4.73557	13	75.40000	15359.40000	18.45000	
CT	DUAL DUCT 50,000 CFM	115.76664	13342.51055	70.49419	16150.32	7.69816	172.53780	5.11167	13	105.30000	27105.40000	26.32500	
CT	3 DX MULTI ZONE 6500 CFM	95.35721	3279.48046	55.10597	5307.21	6.99816	67.83537	4.43932	13	36.40000	5997.48000	9.10000	
CT	3 DX MULTI ZONE 10,000 CFM	99.04121	4307.37514	56.18497	6421.71	7.37425	82.92327	4.43932	13	42.90000	8050.70000	10.72500	
CT	3 DX MULTI ZONE 25,000 CFM	117.22760	8152.48290	63.73965	10620.04	7.73035	172.53780	5.17435	13	105.30000	27105.40000	26.32500	
CT	3 DX MULTI ZONE 50,000 CFM	134.01900	13342.51055	71.22467	16181.12	7.73035	172.53780	5.17435	13	105.30000	27105.40000	26.32500	
CT	D.D. VARI. VOL. 6500 CFM	96.27774	3517.90426	44.90187	5334.69	6.87279	82.92327	4.37684	13	36.40000	5997.48000	9.10000	
CT	D.D. VARI. VOL. 10000 CFM	99.51176	4661.51144	44.90187	6743.75	7.37425	108.23568	4.37684	13	42.90000	8050.70000	10.72500	
CT	D.D. VARI. VOL. 25000 CFM	119.04364	8767.62723	56.43314	11727.76	7.62499	168.50269	4.37684	13	83.20000	16860.00000	20.80000	
CT	D.D. VARI. VOL. 50000 CFM	136.87404	14220.85233	59.61560	17127.76	7.64967	265.05233	4.37684	13	115.70000	29680.00000	28.92500	
CT	VARIABLE VOLUME 6500 CFM	150.37614	20992.62642	59.61560	26113.07	6.87279	67.83537	4.37684	13	32.50000	48760.00000	42.25000	
CT	VARIABLE VOLUME 10000 CFM	150.37614	20992.62642	59.61560	26113.07	6.87279	67.83537	4.37684	13	32.50000	48760.00000	42.25000	
CT	VARIABLE VOLUME 25000 CFM	150.37614	20992.62642	59.61560	26113.07	6.87279	67.83537	4.37684	13	32.50000	48760.00000	42.25000	
CT	VARIABLE VOLUME 50000 CFM	150.37614	20992.62642	59.61560	26113.07	6.87279	67.83537	4.37684	13	32.50000	48760.00000	42.25000	
CT	TEMP. REHEAT 6500 CFM	96.27774	3517.90426	44.90187	5334.69	6.87279	82.92327	4.37684	13	36.40000	5997.48000	9.10000	
CT	TEMP. REHEAT 10000 CFM	99.51176	4661.51144	44.90187	6743.75	7.37425	108.23568	4.37684	13	42.90000	8050.70000	10.72500	
CT	TEMP. REHEAT 25000 CFM	119.04364	8767.62723	56.43314	11727.76	7.62499	168.50269	4.37684	13	83.20000	16860.00000	20.80000	
CT	TEMP. REHEAT 50000 CFM	136.87404	14220.85233	59.61560	17127.76	7.64967	265.05233	4.37684	13	115.70000	29680.00000	28.92500	
CT	2 PIPE INDUCTION 6500 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE INDUCTION 10000 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE INDUCTION 25000 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE INDUCTION 50000 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE INDUCTION 6500 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE INDUCTION 10000 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE INDUCTION 25000 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE INDUCTION 50000 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE FAN COIL 200 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE FAN COIL 400 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE FAN COIL 600 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	2 PIPE FAN COIL 1200 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE FAN COIL 200 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE FAN COIL 400 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE FAN COIL 600 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	4 PIPE FAN COIL 1200 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	UNIT VENT 1200 CFM	82.23680	3016.03001	52.48027	16150.06	7.06677	69.36931	4.50335	28	37.70000	6181.92000	7.42500	
CT	SIN. ZONE DRAIN THRU 6500CFM	92.11972	2343.26538	54.12389	670.81	6.89415	64.16230	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE DRAIN THRU 10000CFM	92.11972	2343.26538	54.12389	670.81	6.89415	64.16230	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE DRAIN THRU 25000CFM	92.11972	2343.26538	54.12389	670.81	6.89415	64.16230	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE DRAIN THRU 50000CFM	92.11972	2343.26538	54.12389	670.81	6.89415	64.16230	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE ORAINTHRU 1000CFM	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE ORAINTHRU 2500CFM	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE ORAINTHRU 5000CFM	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.39172	14	3.12000	527.86000	1.56000	
CT	SIN. ZONE ORAINTHRU 10000CFM	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.39172	14	3.12000	527.86000	1.56000	
CT	UNIT HEATER 400 CFM	88.82188	207.15968	53.29943	3661.14	7.13495	52.84416	4.39172	14	3.12000	527.86000	1.56000	
CT	UNIT HEATER 1200 CFM	88.82188	207.15968	53.29943	3661.14	7.13495	52.84416	4.39172	14	3.12000	527.86000	1.56000	
CT	UNIT HEATER 4000 CFM	88.82188	207.15968	53.29943	3661.14	7.13495	52.84416	4.39172	14	3.12000	527.86000	1.56000	
CT	UNIT HEATER 12000 CFM	88.82188	207.15968	53.29943	3661.14	7.13495	52.84416	4.39172	14	3.12000	527.86000	1.56000	
CT	GASFIRED RADIANT HTR 5000H	88.82188	207.15968	53.29943	3661.14	7.13495	52.84416	4.39172	14	3.12000	527.86000	1.56000	

See Notes on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 25

Zone: 2	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (@ 7%)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		labor		material		equipment	D.C. Total		um	labor		material		equipment	yr		labor		material		equipment
	HEAT PUMP ST	CT	55.53798	3214.78698	54.45463	4470.92				4.57981	209.46387	4.57981	19	4.57981	19	8.38500	2994.50000	2994.50000	4.19250		
	HEAT PUMP 10T	CT	120.76334	6167.03385	118.29993	8898.06				10.04567	396.39907	10.04567	19	10.04567	19	14.30000	5989.00000	5989.00000	4.76667		
	HEAT PUMP 25T	CT	151.73350	16660.56098	147.95440	20089.78				12.58793	1035.96047	12.58793	19	12.58793	19	19.50000	17755.00000	17755.00000	4.87500		
	HEAT PUMP 1T	CT	52.63471	545.70140	51.75004	1736.65				4.36615	12.26970	4.36615	17	4.36615	17	5.53800	1272.00000	1272.00000	2.76900		
	DUCTCOIL 1-ROW H.N.12X24	CT	30.23553	19.45524	15.11777	656.82				2.54603	0.00000	1.27302	21	1.27302	21	2.34000	80.56000	80.56000	1.17000		
	VENTILATION SYSTEM																				
	FIXTURES																				
	EXHAUST FAN 10,000 CFM	CT	51.50714	255.44747	51.50714	1423.63				4.41985	21.92005	4.41985	38	4.41985	38	26.00000	2851.40000	2851.40000	6.50000		
	EXHAUST FAN 10,000 CFM	CT	51.93848	261.44409	51.72281	1438.72				4.45686	22.43432	4.43836	38	4.43836	38	26.00000	2929.84000	2929.84000	6.50000		
	EXHAUST SYSTEM																				
	EQUIPMENT																				
	EXHAUST FAN <200 CFM	CT	2.26146	4.15496	2.26146	55.44				0.19406	0.35654	0.19406	32	0.19406	32	3.25000	41.58380	41.58380	3.25000		
	EXHAUST FAN 1000 CFM	CT	16.68555	87.71692	16.01371	464.00				1.31649	0.94596	1.31649	20	1.31649	20	5.20000	296.80000	296.80000	2.60000		
	EXHAUST FAN 10,000 CFM	CT	52.00104	262.31370	51.75009	1440.91				4.46223	22.50925	4.44104	32	4.44104	32	26.00000	1805.18000	1805.18000	6.50000		
	EXHAUST FAN 25,000 CFM	CT	52.00104	808.43070	26.00052	1897.83				4.46223	68.78997	2.23111	32	2.23111	32	26.00000	4112.80000	4112.80000	6.50000		
	EXHAUST FAN 50,000 CFM	CT	52.00104	818.43052	51.75006	1997.02				4.46223	70.73985	4.44104	32	4.44104	32	32.50000	5406.00000	5406.00000	8.12500		
	EXHAUST FAN, 5000 CFM	CT	20.38361	328.61573	17.54869	981.48				1.32551	1.01221	1.29497	17	1.29497	17	15.40000	1632.40000	1632.40000	7.80000		
	AIR CURTAIN, 1000 CFM	CT	5.10845	211.84227	5.10845	327.70				0.36629	2.90079	0.36629	19	0.36629	19	3.25000	689.00000	689.00000	3.25000		
	FIXTURES																				
	METAL FLUE/CHIMNEY	LF	0.00000	0.00000	0.00000	0.00				0.00000	0.00000	0.00000	28	0.00000	28	9.10000	124.02000	124.02000	4.55000		
	SPECIAL SYSTEM																				
	HUMIDITY CONTROL SYSTEM																				
	ROOM HUMIDIFIER, FLOOR TYPE	CT	7.62207	29.44208	7.62207	202.31				0.65052	0.22263	0.65052	16	0.65052	16	0.13000	84.80000	84.80000	0.13000		
	CONTROLS/INSTRUMENT.																				
	DEVICES																				
	THERMOSTATS/PNEUMATICS																				
	HUMIDITY SENSOR	CT	15.01479	48.37966	15.01479	388.92				1.27113	0.00000	1.27113	20	1.27113	20	0.78000	187.22780	187.22780	0.78000		
	FLOW SENSOR	CT	14.75048	76.87348	14.75048	411.41				0.00000	0.00000	0.00000	10	0.00000	10	1.56000	200.53080	200.53080	1.56000		
	RADIATION SENSOR	CT	14.96071	36.25551	14.96071	375.56				1.25953	0.00000	1.25953	14	1.25953	14	0.78000	100.04280	100.04280	0.78000		
	WIND VELOCITY SENSOR	CT	14.98453	39.17598	14.98453	364.26				1.26464	0.00000	1.26464	17	1.26464	17	0.78000	77.11500	77.11500	0.78000		
	PRESSURE SENSOR	CT	14.70170	39.17598	14.70170	372.61				0.00000	0.00000	0.00000	8	0.00000	8	1.56000	91.05400	91.05400	1.56000		
	DUMPER CONTROLLER/ELECT.	CT	14.98453	18.45778	14.98453	358.31				1.26464	0.00000	1.26464	17	1.26464	17	0.78000	58.30000	58.30000	0.78000		
	SIMPLEX AIR COMP.	CT	15.60846	119.19091	15.60846	475.01				1.25366	0.00000	1.25366	13	1.25366	13	2.60000	287.20700	287.20700	2.60000		
	1 HP	CT	54.14372	1537.05044	35.45376	2695.22				4.56985	0.00000	4.54585	21	3.00418	21	3.67900	6103.62980	6103.62980	1.83950		

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 26

COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment	labor	material	equipment	labor	material	equipment
Zone: 3										
HVAC										
NATURAL GAS SYSTEM										
EQUIPMENT										
GAS METER	CT	0.13209	33.38905	0.13209	0.00000	0.00000	0.00000	0.39000	98.58000	0.39000
PIPING SYSTEM										
PIPE/FITTINGS, STEEL/IRON	TF	3.63916	6.53420	1.81958	0.31228	0.56070	0.15614	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, 1/2"	CT	0.30339	5.27562	0.30339	0.01987	0.00000	0.01987	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.40404	89.39245	0.31777	0.01987	0.00000	0.01987	0.62400	323.50000	0.51200
FUEL OIL SYSTEM										
STORAGE SYSTEMS										
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	0.10400	3.39188	0.10400	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23364	0.72663	0.03553	0.00000	0.03553	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM										
PIPE/FITTINGS, COPPER	TF	0.07159	0.03289	0.07159	0.00514	0.00202	0.00614	55.51000	1113.00000	27.75500
LPG SYSTEM										
STORAGE SYSTEM										
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM										
PIPE/FITTINGS, STEEL/IRON	TF	3.63916	6.53420	1.81958	0.31228	0.56070	0.15614	1074.4500	1929.20000	537.22500
STEAM CENTRAL										
PRESS. RED. REG. SYSTEM										
STEAM CONVERTOR, <300,000	CT	9.93352	9.46921	9.93352	0.85240	0.81084	0.85240	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL	CT	10.13355	51.30320	9.17187	0.78452	0.66119	0.78452	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	7.12678	293.14639	4.56339	0.00000	0.00000	0.00000	7.80000	250.53100	3.90000
COND. METER, <300 G/HR.	CT	7.70653	162.01422	7.70653	0.66130	13.50250	0.66130	0.65000	1007.00000	0.65000
VALVES										
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.43000	20.22480	0.71500
EQUIPMENT										
CAST IRON RADIATOR, 10 SECT	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.20000	175.96000	2.60000
BASEBORED RADIATOR, 10 FT	CT	1.02492	45.75479	0.51246	0.00000	0.00000	0.00000	5.20000	232.14000	2.60000
FIRRED RADIATOR, WALL 10 F	CT	1.02492	51.70919	0.51246	0.00000	0.00000	0.00000	5.20000	262.35000	2.60000
SOLAR										
EQUIPMENT										
SOLAR PANEL, 3' X 3'	CT	1.00776	90.30832	0.50388	0.00000	0.00000	0.00000	3.90000	349.80000	1.95000
SOLAR STORAGE TANK, 1000GAL	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	15.60000	2194.20000	7.80000
PIPING SYSTEM										
PIPE/FITTINGS, PVC	TF	0.36443	2.01396	0.30273	0.03127	0.17282	0.02598	41.70530	669.12500	20.85265
HEATING GENERATION										
EQUIPMENT										
BOILER GAS 250 KBTU/HR	CT	446.35059	274.57849	446.35059	10397.80	23.56169	39.30152	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	501.59771	530.56778	501.59771	11906.81	45.52823	43.04230	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	516.22208	3134.54587	516.22208	14842.46	268.97644	44.29722	36248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	1418.8706	29249.64000	865.92986	59660.22	0.00000	69.66437	20800.0000	63600.00000	4160.0000
REPAIR BOILER										
BOILER COAL 100,000 KBTU/H	CT	1717.7141	54550.57860	1002.3735	91219.25	0.00000	80.45900	3641600.0000	1590000.00000	8320.0000
REPAIR BOILER										
BOILER OIL 250 KBTU/HR	CT	508.08538	191.44521	508.08538	11714.84	16.42970	43.59901	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	546.88241	191.44521	546.88241	13043.94	16.42970	43.59901	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	546.88241	313.53521	546.88241	14371.62	18.32384	53.56750	36248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	516.22208	313.53521	516.22208	12043.46	18.32384	53.56750	36248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU	CT	516.22208	313.53521	516.22208	12043.46	18.32384	53.56750	36248.69000	38160.00000	62.17250
BOILER, PRVWAT COAL SPREAD.	CT	239.98198	5922.48745	339.58198	18160.21	508.21098	46.30174	36248.69000	71020.00000	162.82500
ASH HANDLING SYSTEM	CT	2362.3258	2734.86560	2308.6735	56140.73	59.97292	196.69324	14.182.00000	5618.00000	25.50000
FUEL OIL EQUIPMENT	CT	5752.3598	42583.97608	4212.8242	160120.49	68.53471	317.52972	212000.00000	2600.00000	2600.00000
CHEMICAL FEED SYSTEM	CT	8.71265	91.74459	4.35633	275.41	0.68162	0.34081	2.60000	302.10000	1.30000
FEED-WATER SUPPLY	CT	8.34392	115.11102	7.86308	302.81	0.00000	0.63347	18.28.00000	389.02000	1.25000
DEAERATOR	CT	229.93009	815.50040	224.28926	6012.26	0.00000	19.00420	18.28.00000	2756.00000	9.53333
	CT	274.92855	4178.52000	124.65278	9933.02	0.00000	9.59714	24.260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE 27
COMPONENT DESCRIPTION	UM	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢= 7%)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment	labor	material	equipment	labor	material	equipment
Zone: 3										
BLOWOFF SYSTEM	CT	0.76934	43.59791	0.38467	0.00000	0.00000	0.00000	18	2.60000	1.30000
HOUSE FURN. GAS 25KBTU/HR	CT	50.32491	243.91289	48.78623	4.05433	11.91381	4.05433	18	10.40000	5.20000
HOUSE FURN. GAS 100KBTU/HR	CT	53.42536	305.71195	50.34800	4.05631	14.25619	4.05631	18	20.80000	10.40000
HOUSE FURN. GAS 200KBTU/HR	CT	53.42536	730.88219	50.34800	4.05631	17.36590	4.05631	18	20.80000	10.40000
HOUSE FURN. OIL 25KBTU/HR	CT	65.11249	448.12136	65.11249	5.32326	16.92165	5.32326	18	20.80000	10.40000
HOUSE FURN. OIL 100KBTU/HR	CT	68.18985	617.06145	65.11249	5.32326	18.45631	5.32326	18	20.80000	10.40000
HOUSE FURN. OIL 200KBTU/HR	CT	68.18985	723.84167	65.11249	5.32326	21.50640	5.32326	18	20.80000	10.40000
HOUSE FURN. ELECT. 25KBTU/HR	CT	27.12886	271.96982	25.50018	2.06387	8.07716	2.06387	18	10.40000	5.20000
HOUSE FURN. ELECT. 100KBTU	CT	30.20622	357.84659	27.12886	2.06387	11.63111	2.06387	18	20.80000	10.40000
HOUSE FURN. ELECT. 200KBTU/H	CT	30.20622	456.42540	27.12886	2.06387	14.94275	2.06387	18	20.80000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	60	2.60000	2.60000
BASEBOARD RADIATOR, WALL 10 F	CT	1.02492	45.73479	0.51246	0.00000	0.00000	0.00000	24	2.60000	2.60000
FINISHED RADIATOR, WALL 10 F	CT	1.02492	51.70919	0.51246	0.00000	0.00000	0.00000	24	2.60000	2.60000
EXPANSION TANK	CT	0.06253	0.00000	0.03253	0.00537	0.00000	0.00537	24	3.47100	1.73550
STEAM CONVERTER, <300,000	CT	10.03359	9.44921	10.03359	0.86124	0.81084	0.86124	36	3.58000	3.67900
FLASH TANK 24" DIA.	CT	10.13355	51.30320	9.17187	0.70452	0.66119	0.70452	18	6.50000	3.25000
IMO. FURN. GAS/OIL 500 HSU	CT	14.80304	21.01715	14.80304	1.23028	1.80349	1.23028	40	65.00000	16.25000
IMO. FURN. GAS/OIL 2000 HSU	CT	49.37974	458.42020	42.12031	7.23862	39.33722	7.23862	40	184.60000	16.25000
STURGE TANK 1000 GAL	CT	02.14380	953.07744	82.14280	7.04871	81.78395	7.04871	40	184.60000	16.25000
STURGE TANK 1000 GAL	CT	1.35368	406.74744	0.67184	0.00000	0.00000	0.00000	20	5.20000	2.60000
DIST. PIPING SYSTEM	TF	0.09617	0.05018	0.09617	0.00825	0.00431	0.00825	60	10.74450	5.37225
PIPE/FITTINGS, ST. & C.I.	TF	0.11835	0.05437	0.11835	0.01016	0.00467	0.01016	33	5.55100	2.77550
PIPE/FITTINGS, COPPER	TF	0.31761	1.57850	0.31761	0.02725	0.13545	0.02725	36	8034.80000	120.90000
PIPE AND FITTINGS, PVC	TF	0.42889	2.36627	0.42889	0.03680	0.22622	0.03680	24	91.00000	91.00000
PIPE INSULATION	CT	0.72253	3.72852	0.72253	0.05760	0.01696	0.05760	24	0.26000	0.26000
GATE VALVE, 3/8" - 1 1/2"	CT	0.27032	18.93334	0.27032	0.01352	0.01696	0.01352	24	0.03800	0.03800
GATE VALVE, 2" - 3"	CT	1.13142	8.89710	1.13142	0.08543	0.46048	0.08543	24	0.57200	0.57200
DRAIN VALVE	CT	0.42314	5.96452	0.42314	0.00000	0.00000	0.00000	16	1.43000	0.68900
RADIATOR VALVE 1"	CT	9.12678	293.14632	4.56339	0.00000	0.00000	0.00000	12	7.80000	3.90000
PRESSURE REDUCER VALVE 2"	CT	9.45010	93.43977	9.45010	0.04650	0.28584	0.04650	36	91.00000	91.00000
STEAM TRAP, F & T, <1"	CT	0.54192	3.33102	0.54192	0.17410	0.43508	0.17410	18	4.19900	4.19900
PIPE INSULATION	TF	0.45192	114.84915	0.45192	0.17410	0.43508	0.17410	18	4.19900	4.19900
CIRCULATION PUMP, < 1 HP	CT	3.27132	424.99827	2.65008	1.82792	7.61890	1.82792	24	15.60000	7.80000
CIRCULATION PUMP, 5 HP	CT	24.37661	464.85444	22.83923	1.82792	7.61890	1.82792	24	15.60000	7.80000
COND. RCVR., 10 - 15 GAL.	CT									
COOLING GENERATION EQUIPMENT	CT									
A/C DX PACKAGE 5T	CT	49.46261	877.98830	49.46261	3.63988	0.00000	3.63988	30	8.38500	4.19250
REPAIR AIR CONDITIONER	CT									
A/C DX PACKAGE 20T	CT	114.60400	3054.57713	114.60400	9.22968	0.00000	9.22968	15	20.80000	6.80333
REPAIR AIR CONDITIONER	CT									
A/C DX PACKAGE 50T	CT	145.78294	9231.32086	145.78294	11.82959	0.00000	11.82959	15	20.80000	21.92750
REPAIR AIR CONDITIONER	CT									
A/C WINDOW 1T	CT	21.68643	180.24563	21.68643	1.68712	0.06304	1.68712	15	23.40000	23.40000
A/C WINDOW 2T	CT	21.86256	252.05003	21.86256	1.68712	0.06304	1.68712	15	23.40000	23.40000
A/C PAD MTD. 4T	CT	58.63468	506.30397	57.53391	4.84255	0.31520	4.84255	15	5.98000	5.98000
A/C PAD MOUNTED 20 TON	CT	116.80757	4621.52213	114.12570	9.07357	0.00000	9.07357	15	6.50000	6.50000
REPAIR AIR COOL RECIP. 20T	CT									
REPAIR HERMETIC CHILLER	CT									
CHILLER-AIR COOL RECIP. 20T	CT	268.81721	1734.07626	134.40861	22.40923	0.00000	22.40923	15	20.80000	20.80000
REPAIR HERMETIC CHILLER	CT									
CHILLER AIR COOL REC.50T	CT	334.02880	3859.48650	165.62742	28.66314	331.18405	14.21255	15	19.89000	19.89000
CHILLER AIR COOL REC.100T	CT	334.02880	9926.95830	164.93393	27.94904	0.00000	13.97452	30	24.57000	18.20000
REPAIR HERMETIC CHILLER	CT									
CHILLER-AIR COOL RECIP. 5T	CT	147.62393	678.55158	147.62393	12.08959	0.00000	12.08959	15	15.60000	6.14250
REPAIR HERMETIC CHILLER	CT									
CHILLER AIR COOL REC. 10T	CT	212.83552	1314.02052	106.41776	17.54940	0.00000	8.77470	30	20.80000	19.89000
REPAIR HERMETIC CHILLER	CT									
CHILLER AIR COOL REC. 15T	CT	273.43216	3071.43321	136.71608	22.74922	0.00000	11.37461	30	24.57000	12.28500
See NOTES on the last page of this table for Explanation of Column Headings										

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 28

COMPONENT DESCRIPTION	Zone: 3	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources		Washington		Annual Maintenance and Repair					Replacement and High Costs Tasks				
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	labor	material	equipment
REPAIR HERMETIC CHILLER	CT	268.67681	1618.47118	134.33841	7282.18	22.74922	0.00000	11.37461	15	24.57000	9048.30000	12.28500	24.57000	9048.30000	12.28500
CHILLER WAT. COOL. REC. 20T	CT	271.23061	3805.63320	134.59525	9519.91	22.74922	0.00000	11.37461	15	29.90000	9540.00000	12.28500	29.90000	9540.00000	12.28500
REPAIR HERMETIC CHILLER	CT	271.23061	9037.20280	134.08523	15549.85	22.74922	0.00000	11.37461	15	48.10000	15909.00000	12.02500	48.10000	15909.00000	12.02500
CHILLER WAT. COOL. REC. 100T	CT	238.37849	1148.07040	119.18925	6173.89	20.14931	0.00000	10.07465	15	18.07000	11236.00000	6.02333	18.07000	11236.00000	6.02333
REPAIR HERMETIC CHILLER	CT	271.23061	14935.31520	134.08523	20647.96	22.74922	0.00000	11.37461	15	20.80000	29044.00000	4.51750	20.80000	29044.00000	4.51750
CHILLER WAT. COOL. REC. 200T	CT	271.23061	14935.31520	134.08523	20647.96	22.74922	0.00000	11.37461	15	20.80000	29044.00000	4.51750	20.80000	29044.00000	4.51750
REPAIR HERMETIC CHILLER	CT	391.93358	7563.51647	195.99179	15826.53	33.14886	0.00000	16.57443	15	10.53000	3392.00000	5.20000	10.53000	3392.00000	5.20000
CHILL. HERMETIC CENT. 100T	CT	391.93358	22546.94062	195.99179	30806.24	33.14886	0.00000	16.57443	15	18.07000	44096.00000	18.52500	18.07000	44096.00000	18.52500
REPAIR CHILLER	CT	391.93358	67497.21307	195.99179	75760.23	33.14886	0.00000	16.57443	15	16.77000	37789.00000	4.51750	16.77000	37789.00000	4.51750
CHILL. HERMETIC CENT. 300T	CT	1016.9738	22546.94062	508.46893	43984.75	86.44703	0.00000	16.57443	15	62.40000	61771.50000	15.60000	62.40000	61771.50000	15.60000
REPAIR CHILLER	CT	391.93358	67497.21307	195.99179	75760.23	33.14886	0.00000	16.57443	15	16.77000	37789.00000	4.51750	16.77000	37789.00000	4.51750
CHILL. OPEN CENT. 300T	CT	452.58022	7653.27197	226.29011	17193.66	38.34688	0.00000	19.17434	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
REPAIR CHILLER	CT	458.21619	32402.09452	229.10509	42061.29	38.34688	0.00000	19.17434	15	107.90000	67840.00000	24.37500	107.90000	67840.00000	24.37500
CHILL. DBL. COOL. HERM. 100T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
REPAIR CHILLER	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
CHILL. DBL. COOL. HERM. 300T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
REPAIR CHILLER	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
CHILL. DBL. COOL. HERM. 900T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
REPAIR CHILLER	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	16.77000	19283.18000	8.12500	16.77000	19283.18000	8.12500
CHILL. ONE STG. ABS. 100T	CT	1328.4575	7584.95840	664.22877	30508.84	113.74610	0.00000	56.87305	15	65.00000	37100.00000	16.25000	65.00000	37100.00000	16.25000
REPAIR CHILLER	CT	1328.4575	7584.95840	664.22877	30508.84	113.74610	0.00000	56.87305	15	65.00000	37100.00000	16.25000	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	108.00000	61490.00000	4.29000	108.00000	61490.00000	4.29000
REPAIR CHILLER	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	108.00000	61490.00000	4.29000	108.00000	61490.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	108.00000	61490.00000	4.29000	108.00000	61490.00000	4.29000
REPAIR CHILLER	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	15	108.00000	61490.00000	4.29000	108.00000	61490.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	104.69597	2584.95840	92.34792	6478.35	15.84883	0.00000	7.92442	15	184.60000	125822.00000	28.60000	184.60000	125822.00000	28.60000
AIR COOLED CONDENSER 5T	CT	30.89572	330.50599	29.93613	1028.15	2.48649	0.00000	2.48649	23	20.80000	2438.00000	4.55000	20.80000	2438.00000	4.55000
REPAIR CONDENSER 5T	CT	33.36325	1703.01977	15.95051	1403.98	4.27349	0.00000	2.13674	23	31.20000	5294.70000	6.93333	31.20000	5294.70000	6.93333
AIR COOLED CONDENSER 20T	CT	59.67164	3110.67282	27.36829	2520.35	4.27349	0.00000	2.13674	23	31.20000	5294.70000	6.93333	31.20000	5294.70000	6.93333
REPAIR CONDENSER 20T	CT	63.69383	1354.15975	29.37938	4360.65	4.61863	0.00000	2.30932	23	46.80000	10578.80000	11.70000	46.80000	10578.80000	11.70000
AIR COOLED CONDENSER 100T	CT	174.86543	2533.40710	84.69102	2588.93	16.06421	0.00000	7.03210	23	52.00000	10077.00000	13.00000	52.00000	10077.00000	13.00000
COOLING TOWER 50T	CT	207.12381	4305.15046	99.44936	8658.16	17.76585	0.00000	8.18089	23	78.00000	43142.00000	32.17500	78.00000	43142.00000	32.17500
REPAIR TOWER 50T	CT	234.17893	9949.88896	110.30376	14864.67	16.36178	0.00000	8.51675	23	100.00000	3688.80000	9.10000	100.00000	3688.80000	9.10000
COOLING TOWER 300T	CT	106.92755	1047.05491	51.54458	3294.95	8.51675	0.00000	3.73929	23	182.00000	31800.00000	25.50000	182.00000	31800.00000	25.50000
REPAIR TOWER 300T	CT	181.34934	2552.81933	85.39690	6358.77	13.75011	0.00000	6.87505	23	100.00000	10038.20000	7.00000	100.00000	10038.20000	7.00000
COOLING TOWER 900T	CT	78.13463	7474.83732	29.47136	9091.21	3.41103	0.00000	1.70552	23	182.00000	31800.00000	25.50000	182.00000	31800.00000	25.50000
EVAPORATIVE CONDENSER 20T	CT	0.06253	0.00000	0.06253	1.42	0.00000	0.00000	0.00000	60	3.47100	135.68000	1.33550	3.47100	135.68000	1.33550
REPAIR CONDENSER 20T	CT	8.51421	198.33918	8.24004	390.58	0.63555	0.00000	0.63555	23	2.60000	855.42000	1.30000	2.60000	855.42000	1.30000
EVAPORATIVE CONDENSER 300T	CT	8.51421	253.33950	8.26745	446.74	0.63555	0.00000	0.63555	23	2.60000	1051.52000	1.43000	2.60000	1051.52000	1.43000
REPAIR CONDENSER 300T	CT	8.65129	327.97725	8.30858	523.09	0.63555	0.00000	0.63555	23	2.60000	1051.52000	1.43000	2.60000	1051.52000	1.43000
EXPANSION TANK	TF	0.20836	0.10873	0.20836	4.83	0.01788	0.00933	0.01788	36	10.74450	41.34000	5.37225	10.74450	41.34000	5.37225
REFRIG. FAN COIL 1T	TF	1.17606	10.09117	0.62901	35.01	0.00703	0.00323	0.00703	24	5.51100	51.00720	2.77500	5.51100	51.00720	2.77500
REFRIG. FAN COIL 3T	TF	53.22240	1765.84492	27.72429	2891.33	0.19105	0.03928	0.19105	24	24.16000	8327.00000	120.60000	24.16000	8327.00000	120.60000
PIPE AND FITTINGS, COPPER	CT	0.29280	3.72852	0.29280	10.37	0.01347	0.00696	0.01347	24	0.68900	17.91400	0.68900	0.68900	17.91400	0.68900
GATE VALVE, 3/8", 1 1/2"	CT	0.27032	18.93342	0.27032	25.06	0.01352	0.00392	0.01352	24	0.72000	94.05380	0.57200	0.72000	94.05380	0.57200
DRAIN VALVE, 2"-3"	CT	1.13142	8.89710	1.13142	34.56	0.08343	0.04606	0.08343	24	0.68900	17.91400	0.68900	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings



COMPONENT DESCRIPTION	Zone: 3	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS										Replacement and High Costs Tasks			
		By Resources				Annual Maintenance and Repair													
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	yr	labor	material	equipment	yr	labor	material
PIPE INSULATION	TF	0.54192	3.16107	0.54192	15.45	0.04650	0.27125	0.04650	36	91.00000	901.00000	91.00000	36	91.00000	901.00000	91.00000	36	91.00000	901.00000
CIRCULATOR PUMP, < 1 HP	CT	3.24923	114.86915	3.24923	188.54	0.17220	0.43508	0.17220	18	4.19900	4.19900	4.19900	18	4.19900	4.19900	4.19900	18	4.19900	4.19900
5 TON CHILLER ACH RECIP	CT	6.64488	424.99827	4.33686	568.32	0.17410	4.17154	0.17410	18	15.60000	1272.00000	7.80000	18	15.60000	1272.00000	7.80000	18	15.60000	1272.00000
HEAT/COOL GENERATION EQUIPMENT																			
MULTI-ZONE 6500 CFM	CT	95.84102	3117.90095	55.37529	5162.08	7.01286	67.96854	4.44895	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000
MULTI-ZONE 10,000 CFM	CT	98.36172	4089.43830	56.00547	6184.76	7.01286	83.01099	4.44895	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000
MULTI-ZONE 25,000 CFM	CT	115.35872	7718.07981	63.33360	10168.00	7.39987	151.17256	4.8912	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000
MULTI-ZONE 50,000 CFM	CT	131.34745	12602.89249	70.64591	15387.61	7.76688	172.80382	5.18413	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000
MULTI-ZONE 2500 CFM	CT	87.82422	1510.42926	53.69750	3393.04	7.06570	52.87750	4.48017	23	26.40000	4240.00000	6.50000	23	26.40000	4240.00000	6.50000	23	26.40000	4240.00000
DUAL DUCT 6500 CFM	CT	94.37652	3117.90095	54.64304	5131.21	6.88719	67.96854	4.38412	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000
DUAL DUCT 10,000 CFM	CT	94.80723	4090.39341	55.27322	6154.83	6.88719	83.09294	4.38412	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000
DUAL DUCT 25,000 CFM	CT	113.89132	7695.15217	62.64132	10114.20	7.26420	149.20515	4.74629	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000
DUAL DUCT 50,000 CFM	CT	129.88362	12602.89249	69.91366	15356.74	7.64121	172.80382	5.12329	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000
3 DK-MULTI ZONE 6500 CFM	CT	98.36172	4090.39341	56.00547	6185.70	7.01286	83.09294	4.44895	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000
3 DK-MULTI ZONE 10,000 CFM	CT	115.35872	7718.07981	63.33360	10168.00	7.39987	151.17256	4.8912	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000
3 DK-MULTI ZONE 25,000 CFM	CT	131.34745	12602.89249	70.64591	15387.61	7.76688	172.80382	5.18413	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000
3 DK-MULTI ZONE 50,000 CFM	CT	151.34745	12578.64042	70.84216	16228.04	7.76688	172.80382	5.18413	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000
D.D. VARI.VOL. 6500 CFM	CT	95.38400	3340.69981	43.91135	5339.51	6.88719	67.96854	4.38412	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000
D.D. VARI.VOL. 10000 CFM	CT	98.40954	4421.30335	44.66756	6481.26	6.88719	83.09294	4.38412	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000
D.D. VARI.VOL. 25000 CFM	CT	116.91906	8309.75248	50.39329	10748.59	7.26420	149.20515	4.74629	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000
D.D. VARI.VOL. 50000 CFM	CT	133.91607	13477.57374	55.74092	16264.63	7.64121	172.80382	5.12329	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000
D.D. VARI.VOL. 100,000CFM	CT	125.42041	13613.11282	53.66759	16228.04	7.70391	285.71676	5.84062	23	169.00000	48760.00000	42.25000	23	169.00000	48760.00000	42.25000	23	169.00000	48760.00000
VARIABLE VOLUME 6500 CFM	CT	92.86410	3117.90095	52.82273	5191.93	6.88719	67.96854	4.38412	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000	9.10000	13	36.40000	5997.48000
VARIABLE VOLUME 10000 CFM	CT	96.89722	4090.39341	55.27322	6154.83	6.88719	83.09294	4.38412	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000	10.75000	13	42.90000	8050.78000
VARIABLE VOLUME 25000 CFM	CT	96.32020	7068.47179	45.24358	9089.57	5.75617	95.42944	3.22509	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000	18.85000	13	75.30000	15359.40000
VARIABLE VOLUME 50000 CFM	CT	129.88362	12602.89249	50.39329	10748.59	7.26420	149.20515	4.74629	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000	26.32500	13	102.30000	27305.60000
TERM. REHEAT 6500 CFM	CT	88.99446	1698.77943	53.50766	3803.62	6.91601	68.05013	4.41135	20	37.70000	4279.20000	8.12500	20	37.70000	4279.20000	8.12500	20	37.70000	4279.20000
TERM. REHEAT 10000 CFM	CT	90.33814	2568.71564	53.84358	4500.80	6.91601	83.34828	4.41135	20	42.90000	8050.78000	10.75000	20	42.90000	8050.78000	10.75000	20	42.90000	8050.78000
TERM. REHEAT 25000 CFM	CT	103.51604	5685.79574	60.47103	7895.80	7.29735	149.21047	4.79269	20	71.50000	15274.60000	17.87500	20	71.50000	15274.60000	17.87500	20	71.50000	15274.60000
TERM. REHEAT 50000 CFM	CT	118.70945	7902.46719	67.60237	10431.26	7.67869	171.37169	5.17403	20	113.10000	22853.60000	28.27500	20	113.10000	22853.60000	28.27500	20	113.10000	22853.60000
2 PIPE INDUCTION 6500 CFM	CT	88.99446	1698.77943	53.50766	3803.62	6.91601	68.05013	4.41135	20	37.70000	4279.20000	8.12500	20	37.70000	4279.20000	8.12500	20	37.70000	4279.20000
2 PIPE INDUCTION 10000 CFM	CT	90.33814	2568.71564	53.84358	4500.80	6.91601	83.34828	4.41135	20	42.90000	8050.78000	10.75000	20	42.90000	8050.78000	10.75000	20	42.90000	8050.78000
2 PIPE INDUCTION 25000 CFM	CT	103.51604	5685.79574	60.47103	7895.80	7.29735	149.21047	4.79269	20	71.50000	15274.60000	17.87500	20	71.50000	15274.60000	17.87500	20	71.50000	15274.60000
2 PIPE INDUCTION 50000 CFM	CT	118.70945	7902.46719	67.60237	10431.26	7.67869	171.37169	5.17403	20	113.10000	22853.60000	28.27500	20	113.10000	22853.60000	28.27500	20	113.10000	22853.60000
4 PIPE INDUCTION 6500 CFM	CT	88.99446	1698.77943	53.50766	3803.62	6.91601	68.05013	4.41135	20	37.70000	4279.20000	8.12500	20	37.70000	4279.20000	8.12500	20	37.70000	4279.20000
4 PIPE INDUCTION 10000 CFM	CT	90.33814	2568.71564	53.84358	4500.80	6.91601	83.34828	4.41135	20	42.90000	8050.78000	10.75000	20	42.90000	8050.78000	10.75000	20	42.90000	8050.78000
4 PIPE INDUCTION 25000 CFM	CT	103.51604	5685.79574	60.47103	7895.80	7.29735	149.21047	4.79269	20	71.50000	15274.60000	17.87500	20	71.50000	15274.60000	17.87500	20	71.50000	15274.60000
4 PIPE INDUCTION 50000 CFM	CT	118.70945	7902.46719	67.60237	10431.26	7.67869	171.37169	5.17403	20	113.10000	22853.60000	28.27500	20	113.10000	22853.60000	28.27500	20	113.10000	22853.60000
2 PIPE FAN COIL 200 CFM	CT	12.97670	219.28768	12.70253	512.70	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
2 PIPE FAN COIL 400 CFM	CT	12.97670	237.15200	12.70253	530.59	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
2 PIPE FAN COIL 600 CFM	CT	13.03154	249.44747	12.72995	544.04	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
2 PIPE FAN COIL 1200 CFM	CT	13.03154	352.28231	12.72995	648.61	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
4 PIPE FAN COIL 200 CFM	CT	13.03154	230.89249	12.72995	525.48	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
4 PIPE FAN COIL 400 CFM	CT	13.03154	412.64189	12.72995	707.23	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
4 PIPE FAN COIL 600 CFM	CT	13.08637	265.31980	12.75737	561.07	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
4 PIPE FAN COIL 1200 CFM	CT	13.19504	378.43813	12.81220	676.50	1.06648	7.78507	1.06648	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
UNIT VENT 400 CFM	CT	21.72557	371.47536	21.45140	863.33	1.81723	3.10156	1.81723	23	3.60000	699.50000	1.30000	23	3.60000	699.50000	1.30000	23	3.60000	699.50000
UNIT VENT 1200 CFM	CT	21.86266	438.54156	21.51995															

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE	30
Zone: 3											
COMPONENT DESCRIPTION											
PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C# 7X)											
By Resources											
Washington											
D.C. Total											
Annual Maintenance and Repair											
HIGH COST REPAIR AND REPLACEMENT COSTS											
Replacement and High Costs Tasks											
Annual Maintenance and Repair											
Replacement and High Costs Tasks											
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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 31

Zone: 4	COMPONENT DESCRIPTION	um	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/F 7%)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
			By Resources			Annual Maintenance and Repair					Replacement and High Costs Tasks				
			labor	material	equipment	Washington	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
HVAC	NATURAL GAS SYSTEM														
	EQUIPMENT														
	GAS METER	CT	0.13209	33.38905	0.13209	36.38		0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	
	PIPING SYSTEM	TF	3.89331	6.99142	1.94690	59.07		0.33413	0.59994	0.16706	93	1074.4500	1929.20000	537.23500	
	PIPE/FITTINGS, STEEL/IPON	CT	0.31023	5.64377	0.31023	12.88		0.02002	0.00000	0.02002	17	0.28000	19.68000	0.26000	
	PRESS. REDUCING VALVE, 2"	CT	0.41794	95.66447	0.32562	104.85		0.02002	0.00000	0.02002	17	0.62400	323.30000	0.51200	
	FUEL OIL SYSTEM														
	STORAGE SYSTEMS														
	OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	37	2.60000	164.30000	1.30000	
	OIL FILTER	CT	1.21193	39.52765	1.21193	67.91		0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000	
	FUEL LEVEL METER	CT	0.21663	160.23284	0.72653	176.71		0.03353	0.00000	0.03353	31	1.30000	620.10000	1.30000	
	DISTRIBUTION SYSTEM														
	PIPE/FITTINGS, COPPER	TF	1.13311	2.10096	0.62186	26.16		0.09723	0.18028	0.05336	31	55.51000	1113.00000	27.75500	
	LPG SYSTEM														
	STORAGE SYSTEM														
	LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	37	5.20000	1574.10000	2.60000	
	DISTRIBUTION SYSTEM														
	PIPE/FITTINGS,STEEL/IPON	TF	3.09381	6.99142	1.94690	89.07		0.33413	0.59994	0.16706	93	1074.4500	1929.20000	537.22500	
	STEAM CENTRAL														
	PRESS-RED./REG. SYSTEM	CT	10.17467	9.65254	10.17467	240.41		0.87309	0.82829	0.87309	33	7.35800	832.10000	3.67900	
	STEAM CONVERTER, <500,000	CT	10.34928	56.53447	9.32033	285.06		0.71149	0.66817	0.71149	17	6.50000	147.34000	3.25000	
	FLASH TANK, 24 GAL.	CT	9.89722	317.59879	9.94871	526.54		0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000	
	STEAM REG. VALVE 2"	CT	7.74183	173.36274	7.74183	348.95		0.66433	14.87632	0.66433	37	0.65000	1007.00000	0.65000	
	COMO. METER, <300 #/HR.														
	VALVES														
	RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	56	1.43000	20.22480	0.71500	
	EQUIPMENT														
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	56	5.20000	175.96000	2.60000	
	BASEBOARD RADIATOR 10 FT	CT	1.09668	48.96834	0.54834	72.08		0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000	
	FIRNED RADIATOR, WALL 10 F	CT	1.09668	55.32562	0.54834	78.45		0.00000	0.00000	0.00000	22	5.20000	262.35000	2.60000	
	SOLAR														
	EQUIPMENT														
	SOLAR PANEL, 3' X 8'	CT	1.07835	96.71970	0.53918	119.45		0.00000	0.00000	0.00000	19	3.90000	349.80000	1.95000	
	SOLAR STORAGE TANK, 1000GAL	CT	2.87352	404.17164	1.43678	464.75		0.00000	0.00000	0.00000	25	15.60000	2194.20000	7.80000	
	PIPING SYSTEM														
	PIPE/FITTINGS, PVC	TF	0.34055	1.88192	0.28290	9.42		0.02922	0.16149	0.02428	29	41.70530	669.12500	20.85265	
	HEATING GENERATION														
	EQUIPMENT														
	BOILER GAS 250 KBTU/HR	CT	447.92270	356.68081	447.92270	10515.57		38.43642	30.60692	38.43642	33	65.00000	3169.40000	32.50000	
	BOILER GAS 2000 KBTU/HR	CT	503.10981	689.21402	503.10981	12101.11		43.17720	59.14173	43.17720	33	184.60000	15032.92000	46.15000	
	BOILER GAS 10,000 KBTU/HR	CT	517.79419	4071.81073	517.79419	15815.38		44.43212	349.40368	44.43212	33	248.60000	38160.00000	62.17250	
	BOILER COAL 40,000 KBTU/HR	CT	1433.3662	31297.56000	869.55374	62002.11		103.98820	0.00000	69.86437	33	20800.000	636000.00000	4160.00000	
	REPAIR BOILER														
	BOILER COAL 100,000 KBTU/H	CT	1735.8443	58369.94940	1006.9061	95406.30		125.17747	0.00000	80.45900	33	41600.000	1590000.00000	8320.00000	
	REPAIR BOILER														
	BOILER OIL 250 KBTU/HR	CT	512.36686	248.71564	512.36686	11869.20		43.96640	21.34239	43.96640	33	65.00000	3169.40000	32.50000	
	BOILER OIL 2000 KBTU/HR	CT	568.56055	248.71564	568.56055	13143.67		48.78840	21.34239	48.78840	33	184.60000	15032.92000	46.15000	
	BOILER OIL 10,000 KBTU/HR	CT	626.12736	277.36945	626.12736	14477.96		53.72823	23.80290	53.72823	33	248.60000	38160.00000	62.17250	
	BOILER GAS/OIL 2000 KBTU/H	CT	518.79718	427.01458	518.79718	12193.33		44.51819	36.64229	44.51819	33	184.60000	18489.92000	46.15000	
	BOILER GAS/OIL 20000 KBTU	CT	561.95686	7693.38347	541.95686	19984.96		46.50553	640.17226	46.50553	33	651.30000	71020.00000	162.82500	
	BOILER PREDRY COAL SPREAD.	CT	2341.9307	2877.50680	2304.8113	56263.37		196.62174	59.97292	196.62174	33	182.00000	5618.00000	45.50000	
	ASH HANDLING SYSTEM	CT	5891.4080	45509.47608	4244.2533	173855.73		317.53104	68.53471	317.53104	22	104.0000	21200.00000	2600.0000	
	FUEL OIL EQUIPMENT	CT	8.75571	97.99806	4.37785	282.57		0.68070	0.20193	0.68070	17	2.60000	302.10000	1.30000	
	CHEMICAL FEED SYSTEM	CT	8.19774	123.14373	7.89327	311.98		0.63232	0.00000	0.63232	17	3.25000	389.02000	1.62500	
	FEED-WATER SUPPLY	CT	230.1164	872.54940	224.08195	4072.32		18.96956	0.00000	18.96956	22	28.60000	2756.00000	9.53333	
	DEAERATOR	CT	278.24745	4471.08000	125.41523	10292.67		19.17120	0.00000	9.58560	22	260.00000	21200.00000	65.00000	

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 32

COMPONENT DESCRIPTION

Zone: 4

Zone: 4	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C-7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	yr	labor	material	equipment	yr
CT	BLOWOFF SYSTEM	0.82316	46.64784	0.41158	64.00	0.00000	0.00000	0.00000	17	2.60000	147.34000	1.30000	17	2.60000	147.34000	1.30000	17
CT	HOUSE FURN. GAS 25KBTU/HR	50.45377	251.26346	48.81045	1390.35	4.04717	11.91381	0.00000	17	10.40000	355.10000	5.20000	17	10.40000	355.10000	5.20000	17
CT	HOUSE FURN. GAS 20KBTU/HR	53.77250	315.47614	50.47986	1524.50	4.04915	14.25619	0.00000	17	20.80000	471.70000	10.40000	17	20.80000	471.70000	10.40000	17
CT	HOUSE FURN. OIL 25KBTU/HR	65.21744	465.67496	63.57112	1939.88	5.31379	17.36590	0.00000	17	20.80000	1786.10000	10.40000	17	20.80000	1786.10000	10.40000	17
CT	HOUSE FURN. OIL 20KBTU/HR	68.51008	645.18231	65.21744	2188.45	5.31379	18.45631	0.00000	17	20.80000	848.00000	5.20000	17	20.80000	848.00000	5.20000	17
CT	HOUSE FURN. OIL 20KBTU/HR	68.51008	756.84338	65.21744	2300.14	5.31379	21.60640	0.00000	17	20.80000	1558.49000	10.40000	17	20.80000	1558.49000	10.40000	17
CT	HOUSE FURN. ELECT. 25KBTU/HR	27.30377	284.41093	25.65745	898.39	2.05040	8.07716	0.00000	17	20.80000	1359.00000	5.20000	17	20.80000	1359.00000	5.20000	17
CT	HOUSE FURN. ELECT. 20KBTU/HR	30.59541	373.39799	27.30377	1056.79	2.05040	11.63111	0.00000	17	20.80000	601.00000	5.20000	17	20.80000	601.00000	5.20000	17
CT	HOUSE FURN. ELECT. 20KBTU/H	30.59541	476.17320	27.30377	1159.56	2.05040	14.94275	0.00000	17	20.80000	951.20000	10.40000	17	20.80000	951.20000	10.40000	17
CT	CAST IRON RADIATOR 10 SECT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	175.94000	2.60000	56	5.20000	175.94000	2.60000	56
CT	BASEBOARD RADIATOR 10 FT	1.09568	48.92833	0.54034	72.08	0.00000	0.00000	0.00000	23	5.20000	232.14000	2.60000	23	5.20000	232.14000	2.60000	23
CT	FINISHED RADIATOR, WALL 10 F	1.09568	55.32632	0.54834	78.45	0.00000	0.00000	0.00000	23	5.20000	262.35000	2.60000	23	5.20000	262.35000	2.60000	23
CT	EXPANSION TANK	0.00000	0.00000	0.00000	1.45	0.00000	0.00000	0.00000	56	5.20000	135.68000	1.73550	56	5.20000	135.68000	1.73550	56
CT	STEAM CONVERTOR, <300,000	10.24156	9.65252	10.24156	241.93	0.87883	0.82829	0.87883	33	7.35800	832.10000	3.67900	33	7.35800	832.10000	3.67900	33
CT	FLASH TANK, 24 GAL.	54.43447	9.32033	9.32033	205.85	0.71149	0.64317	0.71149	17	6.50000	147.34000	3.25000	17	6.50000	147.34000	3.25000	17
CT	STORAGE TANK, DISM.	23.03592	16.22605	16.22605	391.02	1.39227	1.97672	1.39227	62	3.59395	179.698	1.79698	62	3.59395	179.698	1.79698	62
CT	IMO. FURN. GAS/OIL 500 MBTU	49.54700	42.35248	42.35248	1507.39	4.27870	42.09463	4.27870	37	65.00000	6784.00000	16.25000	37	65.00000	6784.00000	16.25000	37
CT	IMO. FURN. GAS/OIL 2000 MBTU	82.50765	1019.67050	82.50765	2801.14	7.08000	87.51550	7.08000	37	184.60000	13780.00000	46.15000	37	184.60000	13780.00000	46.15000	37
CT	SURGE TANK, 1000 GAL	1.43780	435.23863	0.71690	465.55	0.00000	0.00000	0.00000	56	5.20000	1574.10000	2.60000	56	5.20000	1574.10000	2.60000	56
CT	DIST. PIPING SYSTEM	0.10290	0.08370	0.10290	2.39	0.00883	0.00461	0.00883	56	10.74450	41.34000	5.37225	56	10.74450	41.34000	5.37225	56
TF	PIPE/FITTINGS, ST. & C.I.	0.12069	0.05554	0.12069	2.80	0.01037	0.00477	0.01037	33	5.55100	51.00720	2.77550	33	5.55100	51.00720	2.77550	33
TF	PIPE/FITTINGS, COPPER	0.14858	0.02534	0.14858	39.98	0.12430	0.01140	0.12430	33	241.80000	8034.80000	120.90000	33	241.80000	8034.80000	120.90000	33
TF	PIPE INSULATION, PVC	1.13308	3.13308	1.44858	14.60	0.04346	0.02673	0.04346	22	0.26000	954.00000	91.00000	22	0.26000	954.00000	91.00000	22
CT	GATE VALVE, 24" - 1 1/2"	20.23128	0.72612	0.72612	20.44	0.05760	0.01696	0.05760	22	0.26000	17.91400	0.00000	22	0.26000	17.91400	0.00000	22
CT	GATE VALVE, 24" - 3"	20.23128	0.72612	0.72612	26.54	0.01352	0.03392	0.01352	22	0.57200	94.05380	0.57200	22	0.57200	94.05380	0.57200	22
CT	DRAIN VALVE	1.20610	1.20610	1.20610	36.98	0.09103	0.05198	0.09103	22	0.68900	17.91400	0.68900	22	0.68900	17.91400	0.68900	22
CT	RADIATOR VALVE 1"	0.45274	6.40317	0.22637	15.95	0.00000	0.00000	0.00000	7	1.43000	20.22480	0.71500	7	1.43000	20.22480	0.71500	7
CT	PRESSURE REDUCER VALVE 2"	9.69742	317.98879	4.94871	526.54	0.00000	0.00000	0.00000	11	1.30000	75.70520	1.30000	11	1.30000	75.70520	1.30000	11
CT	STEAM TRAP, F & T, <1"	9.51835	96.30941	9.51835	312.19	0.74372	0.40993	0.74372	11	3.00000	250.33100	0.90000	11	3.00000	250.33100	0.90000	11
TF	PIPE INSULATION	0.55358	3.40269	0.55358	15.96	0.04750	0.29199	0.04750	33	91.00000	954.00000	91.00000	33	91.00000	954.00000	91.00000	33
CT	CIRCULATION PUMP, <1 HP	3.36431	122.54363	3.36431	198.85	0.17462	0.43635	0.17462	17	4.19000	371.00000	4.19000	17	4.19000	371.00000	4.19000	17
CT	CIRCULATION PUMP, 5 HP	3.36431	451.80306	2.69961	525.98	0.17462	4.21225	0.17462	17	4.19000	1272.00000	2.69950	17	4.19000	1272.00000	2.69950	17
CT	COND. RCVR., 10 - 15 GAL.	24.93975	496.28632	23.29473	1056.66	1.85777	6.05666	1.85777	22	15.60000	1908.00000	7.80000	22	15.60000	1908.00000	7.80000	22
CT	COOLING GENERATION EQUIPMENT																
CT	A/C DX PACKAGE 5T	49.95557	939.42415	49.95557	2072.42	3.63988	0.00000	3.63988	30	8.38500	1855.00000	4.19250	30	8.38500	1855.00000	4.19250	30
CT	REPAIR AIR CONDITIONER	115.09596	3268.1636	115.09596	5878.72	9.22968	0.00000	9.22968	30	20.41000	2392.23000	20.80000	30	20.41000	2392.23000	20.80000	30
CT	A/C DX PACKAGE 20T	166.33752	9877.26803	146.33752	13196.20	11.82959	0.00000	11.82959	30	47.71000	7950.00000	6.80333	30	47.71000	7950.00000	6.80333	30
CT	REPAIR AIR CONDITIONER	21.82580	192.85797	21.82580	687.87	1.68692	0.06744	1.68692	15	5.98000	530.00000	5.98000	15	5.98000	530.00000	5.98000	15
CT	A/C W/BOX 1T	22.01425	269.68677	22.01425	748.97	1.68692	0.06744	1.68692	15	6.50000	742.00000	6.50000	15	6.50000	742.00000	6.50000	15
CT	A/C W/BOX 2T	58.70935	541.73164	57.53155	1869.49	4.03574	0.33722	4.03574	15	6.50000	530.00000	5.98000	15	6.50000	530.00000	5.98000	15
CT	A/C PAD H/D, 4T	117.45482	4944.97136	114.58517	7599.68	9.06284	0.00000	9.06284	15	20.41000	1484.00000	3.25000	15	20.41000	1484.00000	3.25000	15
CT	A/C PAD MOUNTED 20 TON	269.28860	1855.41552	134.64430	7532.02	22.48923	0.00000	22.48923	15	20.80000	9018.53300	20.80000	15	20.80000	9018.53300	20.80000	15
CT	REPAIR AIR COND. CHILLER	334.61111	4129.54800	165.82153	11178.40	28.71311	354.35814	28.71311	15	19.85000	5119.80000	9.94500	15	19.85000	5119.80000	9.94500	15
CT	CHILLER AIR COOL REC. 20T	334.61111	10621.58160	165.07951	17668.06	27.94904	0.00000	27.94904	30	40.30000	19080.00000	10.07500	30	40.30000	19080.00000	10.07500	30
CT	CHILLER AIR COOL REC. 10T	148.09532	726.03216	148.09532	4084.83	12.08959	0.00000	12.08959	15	24.57000	40280.00000	18.20000	15	24.57000	40280.00000	18.20000	15
CT	REPAIR HERMETIC CHILLER	213.41783	1405.96704	106.70891	5904.81	17.54940	0.00000	17.54940	15	19.85000	29309.00000	6.14250	15	19.85000	29309.00000	6.14250	15
CT	CHILLER AIR COOL REC. 10T	274.01447	3286.35192	137.00723	9062.58	22.74922	0.00000	22.74922	30	20.80000	2003.00000	5.20000	30	20.80000	2003.00000	5.20000	30
CT	REPAIR HERMETIC CHILLER								15	20.80000	3879.60000	6.93333	15	20.80000	3879.60000	6.93333	15
CT	CHILLER AIR COOL REC. 15T								30	26.50000	8268.00000	7.15000	30	26.50000	8268.00000	7.15000	30

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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)															PAGE 33					
COMPONENT DESCRIPTION	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS																			
	By Resources							Annual Maintenance and Repair							Replacement and High Costs Tasks					
	Washington			D.C. Total				Labor			material		equipment		Labor		material		equipment	
	un	labor	material	equipment																
Zone: 4																				
REPAIR HERMETIC CHILLER	CT	268.92637	1731.72115	134.46319			7400.69													
CHILLER WAT. COOL. REC.20T																				
REPAIR HERMETIC CHILLER	CT	271.65887	4071.92640	134.73801			9795.00													
CHILLER WAT. COOL. REC.50T																				
REPAIR HERMETIC CHILLER	CT	271.65887	10525.54560	134.19229			16246.88													
CHILLER WAT. COOL. REC.100T																				
REPAIR HERMETIC CHILLER	CT	238.62805	1229.26080	119.31403			6259.54													
CHILLER WAT. COOL. REC.10T																				
REPAIR HERMETIC CHILLER	CT	271.65887	15980.39040	134.19229			21701.72													
CHILLER WAT. COOL. REC.200T																				
REPAIR HERMETIC CHILLER	CT	392.38103	8092.76165	196.19051			16364.15													
CHILL. HERMETIC CENT. 100T																				
REPAIR CHILLER	CT	392.19258	24124.62734	196.09629			32392.05													
CHILL. HERMETIC CENT. 300T																				
REPAIR CHILLER	CT	392.38103	72220.22443	196.19051			80491.62													
CHILL. HERMETIC CENT. 900T																				
REPAIR CHILLER	CT	1017.6424	24124.62734	508.82122			45576.53													
CHILL. OPEN CENT. 300T																				
REPAIR CHILLER	CT	392.38103	72220.22443	196.19051			80491.62													
CHILL. OPEN CENT. 900T																				
REPAIR CHILLER	CT	452.97767	8188.79765	226.48883			17737.57													
CHILL.OBL.BIOL. HEEM.100T																				
REPAIR CHILLER	CT	459.00800	34669.38014	229.50400			44345.27													
CHILL.OBL.BIOL. HEEM.300T																				
REPAIR CHILLER	CT	470.73859	72393.08923	235.36945			82316.27													
CHILL.OBL.BIOL. HEEM.900T																				
REPAIR CHILLER	CT	1328.6608	2765.83680	664.33045			30774.01													
CHILL. ONE STG. ABS. 100T																				
REPAIR CHILLER	CT	198.53356	2765.83680	99.26678			6950.92													
CHILL. ONE STG. ABS. 300T																				
REPAIR CHILLER	CT	198.53356	2765.83680	99.26678			6950.92													
CHILL. ONE STG. ABS. 900T																				
REPAIR CHILLER	CT	198.53356	2765.83680	99.26678			6950.92													
CHILL. TWO STG. ABS. 300T																				
REPAIR CHILLER	CT	184.89931	2765.83680	92.44966			6663.51													
CHILL. TWO STG. ABS. 900T																				
AIR COOLED CONDENSER 5T	CT	31.04977	341.30942	30.09018			1042.65													
AIR COOLED CONDENSER 20T	CT	33.51730	1716.23394	16.02753			1420.44													
AIR COOLED CONDENSER 50T	CT	56.53565	1352.51685	26.62280			2539.02													
AIR COOLED CONDENSER 100T	CT	59.85569	3172.22172	27.44531			4425.45													
COOLING TOWER 50T	CT	63.81707	1382.82395	29.44100			2720.19													
COOLING TOWER 100T	CT	174.98067	2562.07130	84.75264			6242.06													
COOLING TOWER 300T	CT	207.24705	4364.71472	99.51098			8720.32													
EVAPORATIVE CONDENSER 20T	CT	234.30217	10009.45322	110.36538			16928.83													
EVAPORATIVE CONDENSER 100T	CT	107.21100	1065.88385	51.68631			3319.75													
EVAPORATIVE CONDENSER 300T	CT	181.63279	2583.31116	85.53862			6395.24													
EXPANSION TANK	CT	78.41808	7528.59212	29.61309			9150.94													
REFRIG. FAN COIL 1T	CT	8.55118	0.00000	0.04387			1.45													
REFRIG. FAN COIL 3T	CT	8.60601	199.61528	8.27701			392.68													
REFRIG. FAN COIL 5T	CT	8.68826	255.57024	8.30443			449.79													
DIST. PIPING SYSTEM	CT		332.62482	8.34555			528.58													
PIPE/FITTINGS ST. & C.I.	TF	0.21284	0.11107	0.21284			4.94													
PIPE/FITTINGS COPPER	TF	1.25267	10.79507	0.66732			37.33													
PIPE AND FITTINGS PVC	TF	49.73933	1650.29771	25.90992			2702.13													
GATE VALVE, 3/8" - 1 1/2"	CT	0.30231	3.97573	0.30231			10.83													
GATE VALVE, 2" - 3"	CT	0.27821	20.23128	0.27821			26.54													
DRAIN VALVE	CT	1.20410	9.62795	1.20410			36.98													

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See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE
Zone: 4										34
COMPONENT DESCRIPTION	UNIT	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		BY Resources			Annual Maintenance and Repair					
		Labor	material	equipment	Labor	material	equipment	yr	Labor	material
PIPE INSULATION	TF	0.53358	3.29099	0.53358	7.02011	0.27709	0.04750	33	91.00000	901.00000
CIRCULATOR PUMP < 1 HP	CT	3.34198	122.54363	3.34198	7.02011	0.17270	0.17270	37	4.19900	371.00000
5 TON CHILLER ACH RECIP	CT	6.97306	451.80306	4.50438	0.17462	4.21225	0.17462	17	15.60000	1272.00000
HEAT/COOL GENERATION EQUIPMENT										
MULTI-ZONE 6500 CFM	CT	95.00088	2965.96281	55.21113	4993.26	68.00268	4.45470	14	36.40000	5997.48000
MULTI-ZONE 10,000 CFM	CT	97.35648	3485.73361	55.80033	5940.81	83.07634	4.45470	14	42.90000	8050.70000
MULTI-ZONE 25,000 CFM	CT	113.53789	7026.53765	62.06789	9741.72	151.22233	4.81711	14	75.40000	15359.40000
MULTI-ZONE 50,000 CFM	CT	128.77706	11907.07232	70.06026	14639.93	172.61130	5.19497	14	105.30000	27305.60000
MULTI-ZONE 2500 CFM	CT	97.86119	1510.94323	53.71592	3394.37	52.92161	4.49176	22	26.00000	4240.00000
DUAL DUCT 6500 CFM	CT	97.53340	2965.96281	54.47723	4962.31	68.00268	4.49176	14	36.40000	5997.48000
DUAL DUCT 10,000 CFM	CT	95.68668	3666.70107	55.06613	5930.82	83.16120	4.39172	14	42.90000	8050.70000
DUAL DUCT 25,000 CFM	CT	112.07009	7305.55202	62.23399	9687.83	149.25049	4.75413	14	105.30000	15359.40000
DUAL DUCT 50,000 CFM	CT	127.30926	11907.07232	69.34634	14608.99	172.61130	5.13199	14	105.30000	27305.60000
3 DK. MULTI ZONE 6500 CFM	CT	97.58752	2965.96281	54.83779	4964.58	68.00268	4.45470	14	36.40000	5997.48000
3 DK. MULTI ZONE 10,000 CFM	CT	97.35648	3485.73361	55.80033	5940.81	83.07634	4.45470	14	42.90000	8050.70000
3 DK. MULTI ZONE 25,000 CFM	CT	113.53789	7026.53765	62.06789	9741.72	151.22233	4.81711	14	75.40000	15359.40000
3 DK. MULTI ZONE 50,000 CFM	CT	128.77706	11907.07232	70.06026	14639.93	172.61130	5.19497	14	105.30000	27305.60000
D.D. VARI. VOL. 6500 CFM	CT	94.47532	3174.32882	43.70426	5961.77	83.16120	4.45470	14	36.40000	5997.48000
D.D. VARI. VOL. 10000 CFM	CT	97.30204	4195.93699	44.41094	9465.86	148.76925	4.45470	14	42.90000	8050.70000
D.D. VARI. VOL. 25000 CFM	CT	114.89681	7690.00132	49.91048	14415.74	188.98061	4.81711	14	105.30000	15359.40000
D.D. VARI. VOL. 50000 CFM	CT	131.07822	12725.26444	55.05669	10277.90	285.92371	5.21042	14	105.30000	27305.60000
VARIABLE VOLUME 6500 CFM	CT	92.11972	3666.70107	52.74607	5025.24	68.00268	4.45470	14	36.40000	5997.48000
VARIABLE VOLUME 10000 CFM	CT	95.88648	4667.45837	55.06613	5930.82	83.16120	4.45470	14	42.90000	8050.70000
VARIABLE VOLUME 25000 CFM	CT	127.30926	11907.07232	69.34634	14608.99	172.61130	5.13199	14	105.30000	27305.60000
VARIABLE VOLUME 50000 CFM	CT	131.07822	12725.26444	55.05669	10277.90	285.92371	5.21042	14	105.30000	27305.60000
TERM. REHEAT 6500 CFM	CT	89.49808	1975.57604	53.59476	3890.56	67.99381	4.40621	19	37.70000	5735.00000
TERM. REHEAT 10000 CFM	CT	90.93548	2679.64879	53.59476	4623.75	67.99381	4.40621	19	37.70000	5735.00000
TERM. REHEAT 25000 CFM	CT	104.71850	4315.89377	68.04004	8195.22	171.35249	5.16768	19	113.10000	2253.60000
TERM. REHEAT 50000 CFM	CT	120.65781	8315.89377	68.04004	10884.04	171.35249	5.16768	19	113.10000	2253.60000
PIPE INDUCTION 6500 CFM	CT	89.49808	1975.57604	53.59476	3890.56	67.99381	4.40621	19	37.70000	5735.00000
PIPE INDUCTION 10000 CFM	CT	90.93548	2679.64879	53.59476	4623.75	67.99381	4.40621	19	37.70000	5735.00000
PIPE INDUCTION 25000 CFM	CT	104.71850	4315.89377	68.04004	8195.22	171.35249	5.16768	19	113.10000	2253.60000
PIPE INDUCTION 50000 CFM	CT	120.65781	8315.89377	68.04004	10884.04	171.35249	5.16768	19	113.10000	2253.60000
PIPE INDUCTION 6500 CFM	CT	87.87184	1695.53006	53.37840	3582.08	67.99381	4.40621	19	37.70000	5735.00000
PIPE INDUCTION 10000 CFM	CT	88.84122	2278.57489	53.37840	4180.65	67.99381	4.40621	19	37.70000	5735.00000
PIPE INDUCTION 25000 CFM	CT	102.42172	4856.98593	59.83372	7113.95	149.70959	4.42794	22	37.70000	5735.00000
PIPE INDUCTION 50000 CFM	CT	119.66807	8822.35287	66.48928	9249.40	171.84033	5.19379	22	113.10000	2253.60000
PIPE FAN COIL 200 CFM	CT	13.01368	220.32378	12.73951	316.80	7.89286	1.06966	22	2.60000	609.50000
PIPE FAN COIL 400 CFM	CT	13.01368	250.40810	12.73951	352.68	7.89286	1.06966	22	2.60000	694.30000
PIPE FAN COIL 600 CFM	CT	13.06651	258.00337	12.76692	346.13	7.89286	1.06966	22	2.60000	752.30000
PIPE FAN COIL 1200 CFM	CT	13.15076	353.53841	12.80805	650.70	7.89286	1.06966	22	3.25000	1240.20000
PIPE FAN COIL 200 CFM	CT	13.06651	232.14859	12.76692	527.58	7.89286	1.06966	22	2.60000	664.62000
PIPE FAN COIL 400 CFM	CT	13.06651	266.57590	12.79434	709.33	7.89286	1.06966	22	3.12000	827.85000
PIPE FAN COIL 600 CFM	CT	13.12334	266.57590	12.79434	709.33	7.89286	1.06966	22	3.12000	827.85000
PIPE FAN COIL 1200 CFM	CT	13.23301	379.69423	12.84917	678.59	7.89286	1.06966	22	3.64000	1364.22000
UNIT VENT 400 CFM	CT	21.75022	372.73146	21.47605	865.15	3.20935	1.81934	22	3.64000	1590.00000
UNIT VENT 1200 CFM	CT	21.88731	497.79766	21.54459	935.11	3.20935	1.81934	22	3.64000	1908.00000
SIN. ZONE DRAIN THRU 6500CFM	CT	87.74454	1698.23640	53.31495	3578.11	68.28353	4.42794	22	32.50000	1908.00000
SIN. ZONE DRAIN THRU 10000CFM	CT	88.84122	2278.57489	53.58912	4180.65	68.28353	4.42794	22	32.50000	2278.57489
SIN. ZONE DRAIN THRU 25000CFM	CT	102.42172	4856.98593	59.83372	7113.95	149.70959	4.42794	22	37.70000	6181.92000
SIN. ZONE DRAIN THRU 50000CFM	CT	119.66807	8822.35287	66.48958	9249.40	171.84033	5.19379	22	113.10000	15274.60000
SIL. ZONE DRAIN THRU 1000CFM	CT	82.81408	546.75676	61.48958	2421.53	16.73721	4.92124	19	7.80000	1272.00000
SIL. ZONE DRAIN THRU 2500CFM	CT	85.82535	1399.16635	52.83515	3240.12	52.92161	4.92124	19	23.40000	3710.00000
UNIT HEATER 400 CFM	CT	21.75022	103.34889	21.47605	595.77	3.20935	1.81934	22	3.64000	3710.00000
UNIT HEATER 1200 CFM	CT	21.88731	134.64645	21.54459	629.95	3.20935	1.81934	22	3.64000	461.10000
UNIT HEATER 4000 CFM	CT	21.88731	239.10977	21.54459	734.42	5.51680	1.81934	22	3.25000	828.92000

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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 36

Zone: 5	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS														
		By Resources		Washington D.C. Total	Annual Maintenance and Repair		Replacement and High Costs Tasks													
		UM	labor		material	equipment	material	equipment	yr	Labor	material	equipment								
HVAC	NATURAL GAS SYSTEM																			
	EQUIPMENT																			
	GAS METER	CT	0.13209	33.38905	0.13209	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000								
	PIPING SYSTEM	TF	4.45967	8.00618	2.22948	0.38263	0.68701	0.19131	81	1074.4500	1929.20000	537.22500								
	PIPE/FITTINGS, STEEL/IRON	CT	0.32534	6.46240	0.32534	0.02036	0.00000	0.02036	15	0.26000	19.08000	0.26000								
	PRESS. REDUCING VALVE, 5"	CT	0.44862	109.50171	0.44862	0.02036	0.00000	0.02036	15	0.62400	323.50000	0.31200								
	FUEL OIL SYSTEM																			
	STORAGE SYSTEMS																			
	OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	32	2.60000	164.30000	1.30000								
	OIL FILTER	CT	1.21193	39.52265	1.21193	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000								
LPG	FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000								
	DISTRIBUTION SYSTEM	TF	1.38223	2.57147	0.75580	0.11861	0.22066	0.06486	27	55.51000	1113.00000	27.75500								
	PIPE/FITTINGS, COPPER																			
	STORAGE SYSTEM																			
	LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	32	5.20000	1574.10000	2.60000								
	DISTRIBUTION SYSTEM	TF	4.45967	8.00618	2.22948	0.38263	0.68701	0.19131	81	1074.4500	1929.20000	537.22500								
	PIPE/FITTINGS, STEEL/IRON																			
	STEAM, CENTRAL																			
	PRESS. RED./REG. SYSTEM	CT	12.75712	12.12490	12.75712	1.09469	1.04044	1.09469	28	7.35800	832.10000	3.67900								
	FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	0.86604	0.84149	0.86604	14	6.50000	147.34000	3.25000								
SOLAR	STEAM REG. VALVE 2"	CT	12.71464	410.31967	6.38742	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000								
	COND. METER, <300 #/HR.	CT	7.82002	198.50503	7.82002	0.67104	17.03380	0.67104	32	0.65000	1007.00000	0.65000								
	VALVES																			
	RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47	1.43000	20.22480	0.71500								
	EQUIPMENT																			
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47	5.20000	175.94000	2.60000								
	BASEBOARD RADIATION 10 FT	CT	1.43780	64.18471	0.71890	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000								
	FINNED RADIATOR, WALL 10 F	CT	1.43780	72.53978	0.71890	0.00000	0.00000	0.00000	19	5.20000	262.35000	2.60000								
	SOLAR																			
	EQUIPMENT																			
HEATING GENERATION	SOLAR PANEL, 3' X 8'	CT	1.23474	110.74668	0.61737	0.00000	0.00000	0.00000	16	3.90000	349.80000	1.95000								
	SOLAR STORAGE TANK, 1000GAL	CT	3.52092	495.23094	1.76046	0.00000	0.00000	0.00000	22	15.60000	2194.20000	7.80000								
	PIPING SYSTEM	TF	0.32781	1.75961	0.27393	0.02813	0.15099	0.02351	29	41.70530	669.12500	20.85265								
	PIPE/FITTINGS, PVC																			
	EQUIPMENT																			
	BOILER GAS 250 KBTU/HR	CT	448.84592	404.89559	448.84592	38.51564	34.74425	38.51564	28	65.00000	3169.00000	32.50000								
	BOILER GAS 2000 KBTU/HR	CT	504.09303	782.37938	504.09303	43.25642	67.13628	43.25642	28	184.60000	15032.00000	46.50000								
	BOILER GAS 10,000 KBTU/HR	CT	518.71741	4622.22279	518.71741	44.51134	396.63476	44.51134	28	248.69000	38160.00000	46.17250								
	BOILER COAL 40,000 KBTU/HR	CT	1502.2724	41032.60000	886.78030	103.98820	0.00000	69.86437	28	20800.000	63600.00000	46.00000								
	REPAIR BOILER																			
FUEL OIL EQUIPMENT	BOILER COAL 100,000 KBTU/H	CT	1822.0283	76525.79900	1028.4520	125.17747	0.00000	80.45900	28	41600.000	159000.00000	8320.00000								
	REPAIR BOILER																			
	BOILER OIL 250 KBTU/HR	CT	514.88116	282.33609	514.88116	44.18215	24.22737	44.18215	28	65.00000	3169.00000	32.50000								
	BOILER OIL 2000 KBTU/HR	CT	569.66056	282.33609	569.66056	48.48280	24.22737	48.48280	28	184.60000	15032.00000	46.50000								
	BOILER OIL 10,000 KBTU/HR	CT	627.12737	314.88591	627.12737	53.82263	27.02048	53.82263	28	248.69000	38160.00000	46.17250								
	BOILER GAS/OIL 2000 KBTU/H	CT	520.13290	484.73480	520.13290	44.63281	41.59546	44.63281	28	184.60000	15032.00000	46.50000								
	BOILER GAS/OIL 20000 KBTU/H	CT	543.35151	8733.34611	543.35151	46.63521	769.41187	46.63521	28	65.00000	1689.92000	46.15000								
	BOILER-PHEUMAT COAL SPREAD.	CT	2361.5173	4834.61760	2265.2055	192.41464	99.14442	192.41464	51	182.00000	71020.00000	162.82500								
	ASH HANDLING SYSTEM	CT	6552.6802	59532.34021	4393.5352	315.53170	78.45986	315.53170	19	10400.000	212000.00000	45.50000								
	FUEL OIL EQUIPMENT	CT	9.99134	113.15129	4.99567	0.31495	0.00000	0.31495	14	2.60000	302.10000	1.30000								
FEED-WATER SUPPLY	CHEMICAL FEED SYSTEM	CT	8.51682	140.98085	7.99292	0.62776	0.00000	0.62776	14	3.25000	389.02000	1.62500								
	FEED-WATER SUPPLY	CT	230.53524	998.77440	233.62548	18.89293	0.00000	18.89293	14	28.60000	2756.00000	9.53333								
	DEAERATOR	CT	294.06695	5861.80000	129.06052	12003.20	0.00000	0.00000	19	260.00000	21200.00000	65.00000								

See NOTES on the last page of this table for Explanation of Column Headings

See NOTES on the last page of this Table for Explanation of Column Headings



COMPONENT DESCRIPTION

Zone: 5

COMPONENT DESCRIPTION	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR COSTS (\$ PER UNIT MEASURE)				HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Washington				Annual Maintenance and Repair			
		labor	material	equipment	O.C. Total	labor	material	equipment	yr	labor	material	equipment	yr
BLOWOFF SYSTEM	CT	0.94224	53.39602	0.47112	73.26	0.00000	0.00000	0.00000	14	2.60000	147.34000	1.30000	14
HOUSE FURN GAS 25KBTU/HR	CT	51.57552	49.69104	0.47112	1508.94	4.10330	18.58179	0.00000	14	10.40000	355.10000	5.20000	14
HOUSE FURN GAS 200KBTU/HR	CT	55.34040	430.04373	51.61153	1674.03	4.10330	25.25319	4.10330	14	20.80000	471.70000	10.40000	14
HOUSE FURN GAS 200KBTU/HR	CT	55.34040	962.92415	51.61153	2206.89	4.10330	26.35244	5.36492	14	20.80000	1786.10000	10.40000	14
HOUSE FURN OIL 25KBTU/HR	CT	64.28957	827.77040	64.40509	5112.30	5.36492	26.35244	5.36492	14	20.80000	848.00000	5.20000	14
HOUSE FURN OIL 200KBTU/HR	CT	70.05853	970.83377	66.28957	5547.72	5.36492	26.35244	5.36492	14	20.80000	1358.49000	10.40000	14
HOUSE FURN ELECT 25KBTU/HR	CT	28.75385	363.61065	26.52337	1010.79	2.14422	12.59782	2.14422	14	10.40000	601.02000	5.20000	14
HOUSE FURN ELECT 200KBTU/HR	CT	32.52581	483.55846	28.75385	1209.29	2.14422	12.59782	2.14422	14	10.40000	751.27500	5.20000	14
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	94.50	0.00000	0.00000	0.00000	47	5.20000	954.00000	10.40000	47
PARABAND RADIATION 10 FT	CT	1.43780	64.18871	0.71890	102.85	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000	19
FINNED RADIATION 10 FT	CT	1.43780	72.53978	0.71890	102.85	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000	19
EXHAUST CHIMNEY	CT	0.08023	0.00000	0.08023	1.82	0.00000	0.00000	0.00000	47	3.47100	135.68000	1.73550	47
STEAM CONVERTER, <300,000	CT	12.73381	12.12490	12.73381	300.93	0.00000	0.00000	0.00000	28	7.35000	832.10000	3.67000	28
FLASH TANK, 24 GAL.	CT	12.68117	65.20230	11.50337	347.04	0.88604	0.04149	0.08604	14	6.50000	147.34000	3.67000	14
STORAGE TANK, DIM	CT	18.29824	25.97954	18.29824	440.98	1.57018	2.22931	1.57018	54	3.59395	346.62000	1.73098	54
IND. FURN GAS/OIL 500 HBU	CT	52.32800	660.99427	43.58554	1819.82	4.49029	56.72018	3.74009	32	65.00000	678.40000	16.25000	32
IND. FURN GAS/OIL 2000 HBU	CT	64.44209	1374.23850	84.44209	3289.39	7.24601	117.92395	7.24601	32	184.60000	1370.00000	46.15000	32
SURGE TANK, 1000 GAL	CT	1.64032	490.34006	0.82316	533.06	0.00000	0.00000	0.00000	16	5.20000	1574.10000	2.60000	16
DIST. PIPING SYSTEM	TF	0.11778	0.06166	0.11778	2.73	0.01011	0.00527	0.01011	47	10.74650	41.34000	5.3725	47
PIPE/FITTINGS, ST. & C.I.	TF	0.14487	0.06655	0.14487	3.35	0.01243	0.00571	0.01243	28	5.55100	51.00720	2.77350	28
PIPE AND FITTINGS, COPPER	TF	1.74760	8.59434	1.74760	48.23	0.14996	0.03718	0.14996	28	261.80000	8034.80000	120.90000	28
PIPE INSULATION	TF	0.56909	3.49806	0.56909	16.41	0.04693	0.00172	0.04693	32	0.26000	924.80000	91.00000	32
GATE VALVE, 3/8" - 1 1/2"	CT	0.84039	2.17952	0.84039	24.24	0.04595	0.01942	0.04595	16	0.57200	94.05360	0.57200	16
GATE VALVE, 2" - 3"	CT	0.33855	26.45847	0.33855	34.14	0.01548	0.06894	0.01548	19	0.25000	94.05360	0.57200	19
DRAIN VALVE	CT	1.50521	11.50939	1.50521	45.65	0.11381	0.56239	0.11381	19	0.25000	94.05360	0.57200	19
RADIATOR VALVE 1"	CT	0.51623	7.39947	0.51623	18.25	0.00000	0.00000	0.00000	14	1.45000	20.22480	0.68900	14
PRESSURE REDUCER VALVE 2"	CT	12.77684	410.31067	6.30742	679.61	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000	6
STEAM TRAP F & T, <1"	CT	0.68552	113.92332	0.68552	337.45	0.05967	4.67751	0.05967	28	2.60000	151.41040	2.60000	28
PIPE INSULATION	CT	0.68552	4.27425	0.68552	20.05	0.05967	4.67751	0.05967	28	2.60000	151.41040	2.60000	28
CIRCULATION PUMP, < 1 HP	CT	3.75834	140.03137	3.75834	225.37	0.19193	0.25801	0.19193	14	4.19900	954.00000	91.00000	14
CIRCULATION PUMP, 5 HP	CT	3.75834	521.07039	2.93748	604.57	0.19193	0.25801	0.19193	14	4.19900	954.00000	91.00000	14
COOL. REFR. 10 - 15 GAL.	CT	27.54619	644.57096	25.38949	1263.42	1.99361	10.04039	1.99361	19	15.60000	1908.00000	2.09950	19
COOLING EQUIPMENT	CT	47.79237	669.03223	47.79237	1753.76	3.63908	0.00000	3.63908	39	8.38500	1855.00000	4.19250	39
A/C DX PACKAGE 5T	CT	112.93376	2330.38893	112.93376	4891.73	9.22960	0.00000	9.22960	39	20.41000	2592.23000	20.80000	39
REPAIR AIR CONDITIONER	CT	143.90392	7042.73195	143.90392	10306.47	11.82959	0.00000	11.82959	39	23.40000	9018.53300	6.80333	39
A/C WINDOW 2T	CT	21.24275	137.35157	21.24275	619.34	1.69025	0.05145	1.69025	20	5.98000	21200.00000	11.92750	20
A/C WINDOW 2T	CT	21.24275	192.33257	21.24275	677.17	1.69025	0.05145	1.69025	20	5.98000	21200.00000	11.92750	20
A/C WINDOW 2T	CT	38.41022	386.46343	37.57042	1708.52	4.86808	0.25725	4.86808	20	6.50000	530.00000	5.98000	20
A/C PAD MOUNTED 20 TON	CT	267.22004	1322.95632	133.61002	6955.95	22.40923	0.00000	22.40923	19	20.41000	1484.00000	3.25000	19
REPAIR AIR COOL RECIP. 20T	CT	332.05583	2944.46800	164.90977	9940.02	28.49384	252.66596	14.15612	39	19.60000	10759.00000	20.80000	39
REPAIR HERMETIC CHILLER	CT	332.05583	7573.44560	164.44069	14568.10	27.94904	0.00000	13.97452	39	22.60000	19080.00000	9.94500	39
CHILLER AIR COOL REC-50T	CT	146.02676	517.67856	146.02676	3820.57	12.03959	0.00000	12.03959	39	15.40000	2370.00000	5.20000	39
CHILLER AIR COOL REC-100T	CT	210.86255	1002.48804	105.43127	5447.47	17.54940	0.00000	8.77470	39	20.80000	2003.40000	17.59000	39
CHILLER AIR COOL RECIP. 5T	CT	271.45919	2343.24872	135.72959	8065.61	22.74922	0.00000	11.37461	39	26.60000	8268.00000	7.15000	39
CHILLER AIR COOL REC. 10T	CT	271.45919	2343.24872	135.72959	8065.61	22.74922	0.00000	11.37461	39	26.60000	8268.00000	7.15000	39
CHILLER AIR COOL REC. 15T	CT	271.45919	2343.24872	135.72959	8065.61	22.74922	0.00000	11.37461	39	26.60000	8268.00000	7.15000	39

See NOTES on the last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 39

COMPONENT DESCRIPTION	Zone: 5	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C# 7X)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Annual Maintenance and Repair					Annual Maintenance and Repair					Annual Maintenance and Repair				
		Washington					Equipment					Equipment					Equipment				
		labor	material	equipment	D.C. Total		labor	material	equipment	yr	labor	material	equipment	yr	labor	material	equipment	yr	labor	material	equipment
PIPE INSULATION		0.65337	4.05617	0.69537	19.83		0.05967	0.34806	0.05967	28	91.00000	901.00000	0.05967	28	91.00000	901.00000	0.05967	28	91.00000	901.00000	0.05967
CIRCULAR PUMP < 1 HP		3.73022	140.03137	3.73022	224.63		0.18951	0.47891	0.18951	14	4.19900	371.00000	0.18951	14	4.19900	371.00000	0.18951	14	4.19900	371.00000	0.18951
5 TON CHILLER ACH RECIP		7.89006	521.97029	5.06534	691.87		0.19193	5.23422	0.19193	12	15.60000	1272.00000	0.19193	12	15.60000	1272.00000	0.19193	12	15.60000	1272.00000	0.19193
HEAT/COOL GENERATION EQUIPMENT																					
MULTI-ZONE 6500 CFM		95.00088	2965.96281	55.21113	4993.26		7.02011	68.00268	4.45470	15	36.40000	5997.48000	4.45470	15	36.40000	5997.48000	4.45470	15	36.40000	5997.48000	4.45470
MULTI-ZONE 10,000 CFM		97.35648	3685.74361	55.80033	5960.81		7.02011	83.07904	4.45470	15	42.90000	8050.70000	4.45470	15	42.90000	8050.70000	4.45470	15	42.90000	8050.70000	4.45470
MULTI-ZONE 25,000 CFM		113.53789	7328.53106	62.96789	9741.75		7.39797	151.22233	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711
MULTI-ZONE 50,000 CFM		128.77706	11907.09252	70.08024	14639.93		7.78582	172.61130	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497
MULTI-ZONE 2500 CFM		83.72348	625.69415	53.22361	2426.94		7.18435	53.69106	4.56714	29	26.00000	4240.00000	4.56714	29	26.00000	4240.00000	4.56714	29	26.00000	4240.00000	4.56714
DUAL DUCT 6500 CFM		95.53308	2965.96281	55.21113	4993.26		6.89415	68.00268	4.39172	15	36.40000	5997.48000	4.39172	15	36.40000	5997.48000	4.39172	15	36.40000	5997.48000	4.39172
DUAL DUCT 10,000 CFM		97.58368	3685.74361	55.80033	5960.81		6.89415	83.07904	4.39172	15	42.90000	8050.70000	4.39172	15	42.90000	8050.70000	4.39172	15	42.90000	8050.70000	4.39172
DUAL DUCT 25,000 CFM		112.70709	11907.09252	62.23399	14608.99		7.27201	172.61130	4.75413	15	75.40000	15359.40000	4.75413	15	75.40000	15359.40000	4.75413	15	75.40000	15359.40000	4.75413
DUAL DUCT 50,000 CFM		127.30926	1907.09252	69.34343	1964.59		7.64987	172.61130	5.11199	15	105.30000	27305.60000	5.11199	15	105.30000	27305.60000	5.11199	15	105.30000	27305.60000	5.11199
3 DK.MULTI ZONE 6500 CFM		97.58368	2965.96281	55.21113	4993.26		7.02011	68.00268	4.45470	15	36.40000	5997.48000	4.45470	15	36.40000	5997.48000	4.45470	15	36.40000	5997.48000	4.45470
3 DK.MULTI ZONE 10,000 CFM		97.35648	3685.74361	55.80033	5960.81		7.02011	83.07904	4.45470	15	42.90000	8050.70000	4.45470	15	42.90000	8050.70000	4.45470	15	42.90000	8050.70000	4.45470
3 DK.MULTI ZONE 25,000 CFM		113.53789	7328.53106	62.96789	9741.75		7.39797	151.22233	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711
3 DK.MULTI ZONE 50,000 CFM		128.77706	11907.09252	70.08024	14639.93		7.78582	172.61130	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497
D.D. VARI VOL. 6500 CFM		94.47332	3174.16885	43.41048	4964.59		6.89415	68.00268	4.39172	15	36.40000	5997.48000	4.39172	15	36.40000	5997.48000	4.39172	15	36.40000	5997.48000	4.39172
D.D. VARI VOL. 10000 CFM		97.30204	3956.70107	45.50003	5961.77		6.89415	83.07904	4.39172	15	42.90000	8050.70000	4.39172	15	42.90000	8050.70000	4.39172	15	42.90000	8050.70000	4.39172
D.D. VARI VOL. 25000 CFM		114.89681	7880.01132	59.91048	9741.75		7.39797	151.22233	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711
D.D. VARI VOL. 50000 CFM		131.07822	12725.24414	69.91048	1887.14		7.78582	172.61130	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497
VARIABLE VOLUME 6500 CFM		92.11972	3382.19264	45.50003	4964.59		6.89415	68.00268	4.39172	15	36.40000	5997.48000	4.39172	15	36.40000	5997.48000	4.39172	15	36.40000	5997.48000	4.39172
VARIABLE VOLUME 10000 CFM		92.11972	3382.19264	45.50003	4964.59		6.89415	83.07904	4.39172	15	42.90000	8050.70000	4.39172	15	42.90000	8050.70000	4.39172	15	42.90000	8050.70000	4.39172
VARIABLE VOLUME 25000 CFM		92.11972	3382.19264	45.50003	4964.59		6.89415	151.22233	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711	15	75.40000	15359.40000	4.81711
VARIABLE VOLUME 50000 CFM		92.11972	3382.19264	45.50003	4964.59		6.89415	172.61130	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497	15	105.30000	27305.60000	5.19497
TERN. REHEAT 6500 CFM		90.61359	2145.71590	53.78760	4964.59		6.89264	67.86871	4.39480	16	37.50000	6279.20000	4.39480	16	37.50000	6279.20000	4.39480	16	37.50000	6279.20000	4.39480
TERN. REHEAT 10000 CFM		92.25991	2925.47863	54.19918	4964.59		6.89264	83.08372	4.39480	16	43.50000	6819.92000	4.39480	16	43.50000	6819.92000	4.39480	16	43.50000	6819.92000	4.39480
TERN. REHEAT 25000 CFM		107.36226	6251.81030	69.00564	8858.58		7.27203	148.85441	5.15358	16	113.10000	15274.60000	5.15358	16	113.10000	15274.60000	5.15358	16	113.10000	15274.60000	5.15358
TERN. REHEAT 50000 CFM		124.97410	9231.81030	69.00564	11887.14		7.65142	171.30848	5.15358	16	143.10000	22853.60000	5.15358	16	143.10000	22853.60000	5.15358	16	143.10000	22853.60000	5.15358
2 PIPE INDUCTION 6500 CFM		83.01359	818.93772	52.87675	2605.56		6.89264	67.86871	4.39480	16	37.50000	6279.20000	4.39480	16	37.50000	6279.20000	4.39480	16	37.50000	6279.20000	4.39480
2 PIPE INDUCTION 10000 CFM		83.01359	818.93772	52.87675	2605.56		6.89264	83.08372	4.39480	16	43.50000	6819.92000	4.39480	16	43.50000	6819.92000	4.39480	16	43.50000	6819.92000	4.39480
2 PIPE INDUCTION 25000 CFM		83.01359	818.93772	52.87675	2605.56		6.89264	148.85441	5.15358	16	113.10000	15274.60000	5.15358	16	113.10000	15274.60000	5.15358	16	113.10000	15274.60000	5.15358
2 PIPE INDUCTION 50000 CFM		83.01359	818.93772	52.87675	2605.56		6.89264	171.30848	5.15358	16	143.10000	22853.60000	5.15358	16	143.10000	22853.60000	5.15358	16	143.10000	22853.60000	5.15358
4 PIPE INDUCTION 6500 CFM		83.02975	818.93772	52.87675	2605.56		6.89264	67.86871	4.39480	16	37.50000	6279.20000	4.39480	16	37.50000	6279.20000	4.39480	16	37.50000	6279.20000	4.39480
4 PIPE INDUCTION 10000 CFM		83.02975	818.93772	52.87675	2605.56		6.89264	83.08372	4.39480	16	43.50000	6819.92000	4.39480	16	43.50000	6819.92000	4.39480	16	43.50000	6819.92000	4.39480
4 PIPE INDUCTION 25000 CFM		83.02975	818.93772	52.87675	2605.56		6.89264	148.85441	5.15358	16	113.10000	15274.60000	5.15358	16	113.10000	15274.60000	5.15358	16	113.10000	15274.60000	5.15358
4 PIPE INDUCTION 50000 CFM		83.02975	818.93772	52.87675	2605.56		6.89264	171.30848	5.15358	16	143.10000	22853.60000	5.15358	16	143.10000	22853.60000	5.15358	16	143.10000	22853.60000	5.15358
2 PIPE FAN COIL 200 CFM		12.52243	87.80955	12.52243	371.82		7.05435	84.98119	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214
2 PIPE FAN COIL 400 CFM		12.52243	87.80955	12.52243	371.82		7.05435	84.98119	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214
2 PIPE FAN COIL 600 CFM		12.52243	87.80955	12.52243	371.82		7.05435	84.98119	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214
2 PIPE FAN COIL 1200 CFM		12.52243	87.80955	12.52243	371.82		7.05435	84.98119	4.50214	29	32.50000	4279.20000	4.50214	29	32.50000	4279.20000	4.50214	29			

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 40

Zone: 5	COMPONENT DESCRIPTION	UNIT	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/yr %)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				Replacement and High Costs Tasks			
			BY Resources				Annual Maintenance and Repair				Yr			
			labor	material	equipment	Washington D.C. Total	labor	material	equipment		labor	material	equipment	
	UNIT HEATER 8000 CFM	CT	21.47756	59.61419	21.47756	546.73	1.84300	5.11552	1.84300	29	3.25000	1272.00000	1.62500	
	GASIFIED RADIANT HTR 50MBH	CT	15.16916	0.00000	15.16916	345.58	1.29996	0.00000	1.29996	29	2.60000	445.20000	1.30000	
	HEAT PUMP 5T	CT	48.64421	1240.91385	48.64421	2340.08	4.15873	106.48331	4.15873	39	8.38500	2994.50000	2.19250	
	HEAT PUMP 10T	CT	113.60360	2345.36231	113.60360	4924.94	9.74854	201.51391	9.74854	39	14.30000	5969.00000	4.76667	
	HEAT PUMP 25T	CT	143.90392	6137.27834	143.90392	9401.02	12.34845	526.64211	12.34845	39	19.50000	17755.00000	4.87500	
	HEAT PUMP 1T	CT	31.89464	462.71209	31.89464	1637.00	4.33032	11.46661	4.33032	19	5.53000	1272.00000	2.76000	
	DUCTOIL 1-20W N.W.12X24	CT	30.25043	14.83915	15.12521	652.52	2.55881	0.00000	1.27941	24	2.34000	80.56000	1.17000	
	VENTILATION SYSTEM													
	FIXTURES													
	FORCE DRAFT FAN 10,000 CFM	CT	56.37775	894.06092	51.97660	2158.62	4.33424	21.49550	4.33424	22	26.00000	2851.40000	6.50000	
	1TD DRAFT FAN 10000 CFM	CT	57.11891	922.06561	52.34718	2202.26	4.39784	22.37967	4.36604	22	26.00000	2929.84000	6.50000	
	EXHAUST SYSTEM													
	EQUIPMENT													
	EXHAUST FAN <200 CFM	CT	4.84747	19.67251	4.84747	129.61	0.33885	0.70146	0.33885	19	3.25000	41.58380	3.25000	
	EXHAUST FAN 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	286.40000	2.60000	
	EXHAUST FAN 10,000 CFM	CT	58.26696	759.54244	52.47874	2062.51	4.38302	22.34590	4.34901	19	26.00000	1805.18000	6.50000	
	EXHAUST FAN 25,000 CFM	CT	60.06421	1930.37715	27.33623	3152.89	4.38302	68.06377	2.19151	19	26.00000	4112.80000	6.50000	
	EXHAUST FAN 50,000 CFM	CT	60.06421	2314.86485	52.92805	3454.31	4.38302	70.37549	4.34901	19	32.50000	5446.00000	7.12500	
	EXHAUST FAN 5000 CFM	CT	19.50507	432.83597	17.15916	867.70	1.32783	0.94596	1.29948	19	15.40000	1632.40000	3.25000	
	AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	39	3.25000	689.00000	3.25000	
	FIXTURES													
	METAL FLUE/CHIMNEY	LF	2.88106	39.26473	1.44053	100.00	0.00000	0.00000	0.00000	16	9.10000	124.02000	4.55000	
	SPECIAL SYSTEM													
	HUMIDITY CONTROL SYSTEM													
	ROOM HUMIDIFIER, FLOOR TYPE	CT	7.66276	72.62086	7.66276	246.41	0.04259	0.52085	0.04259	9	0.26000	169.60000	0.26000	
	CONTROLS/INSTRUMENT DEVICES													
	THERMOSTATS/PNEUMATICS													
	HUMIDITY SENSOR	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000	
	FLOW SENSOR	CT	15.01479	25.90858	15.01479	346.74	1.27113	0.00000	1.27113	20	0.78000	100.26540	0.78000	
	RADIATION SENSOR	CT	15.01479	0.00000	15.01479	353.28	1.27113	0.00000	1.27113	29	0.78000	100.04280	0.78000	
	WIND VELOCITY SENSOR	CT	15.01479	19.92652	15.01479	350.45	1.27113	0.00000	1.27113	19	0.78000	77.11500	0.78000	
	PRESSURE SENSOR	CT	14.75048	32.86535	15.15048	369.45	0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000	
	DAMPEN CONTROLLER/ELECT.	CT	15.02079	12.08472	15.01479	355.60	1.27113	0.00000	1.27113	19	0.78000	58.30000	0.78000	
	SIMPLEX AIR COMPRESS 1 HP	CT	15.02079	104.03362	15.62028	256.35	1.25953	0.00000	1.25953	15	2.60000	287.20700	2.60000	
		CT	51.81112	1175.19147	36.32954	254.33	4.36778	4.36483	2.91676	24	3.67900	6103.82960	1.83950	

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 41

Zone: 6	COMPONENT DESCRIPTION	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
			By Resources			Washington D.C. Total	Annual Maintenance and Repair			Replacement and High Costs Tasks
			labor	material	equipment		labor	material	equipment	
HVAC	NATURAL GAS SYSTEM									
	EQUIPMENT									
	GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	0.39000
	PIPING SYSTEM									
	PIPE/FITTINGS, STEEL/IRON	TF	6.88830	12.36810	3.44415	157.57	0.59109	1.06131	0.29534	1929.20000
	PRESS. REDUCING VALVE, 5"	CT	0.32117	7.39222	0.32117	16.68	0.01891	0.00000	0.01891	19.08000
	PRESS. REDUCING VALVE, 2"	CT	0.46232	125.37374	0.34133	135.47	0.01891	0.00000	0.01891	323.30000
	FUEL OIL SYSTEM									
	STORAGE SYSTEMS									
	OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	1.30000
	OIL FILTER	CT	0.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	10.60000
	FUEL LEVEL METER	CT	1.21193	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	620.10000
	DISTRIBUTION SYSTEM									
	PIPE/FITTINGS, COPPER	TF	11.80085	207.95561	5.97119	456.94	0.13523	0.25237	0.07369	1113.00000
	LPG SYSTEM									
	STORAGE SYSTEM									
	LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	1574.10000
	DISTRIBUTION SYSTEM									
	PIPE/FITTINGS, STEEL/IRON	TF	6.88830	12.36810	3.44415	157.57	0.59109	1.06131	0.29534	1929.20000
	STEAM CENTRAL									
	PRESS. RED. / REG. SYSTEM									
	STEAM CONVERTOR, <300,000	CT	12.54964	11.94220	12.54964	296.57	1.07689	1.02477	1.07689	832.10000
	FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	347.04	0.84604	0.84169	0.84604	17.34000
	STEAM REG. VALVE 2"	CT	12.50574	401.67635	6.25287	665.30	0.00000	0.00000	0.00000	250.25100
	COND. METER, <300 #/HR.	CT	7.90933	227.22118	7.90933	406.60	0.67870	19.49794	0.67870	1007.00000
	VALVES									
	RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	20.22480
	EQUIPMENT									
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	175.96000
	BASEBOARD RADIATION 10 FT	CT	1.34368	59.99498	0.67184	88.31	0.00000	0.00000	0.00000	232.14000
	FINNED RADIATOR, WALL 10 F	CT	1.34368	67.79124	0.67184	96.12	0.00000	0.00000	0.00000	262.35000
	JUMPMENT									
	SOLAR PANEL, 3' X 8'	CT	1.41336	126.76752	0.70668	156.56	0.00000	0.00000	0.00000	349.80000
	SOLAR STORAGE TANK, 1000GAL	CT	4.03104	566.98128	2.01552	651.96	0.00000	0.00000	0.00000	2194.20000
	PIPING SYSTEM									
	PIPE/FITTINGS, PVC	TF	0.32781	1.75961	0.27393	9.02	0.02813	0.15099	0.02351	669.12500
	HEATING GENERATION									
	EQUIPMENT									
	BOILER GAS 250 KBTU/HR	CT	448.74266	399.50293	448.74266	10576.99	38.50678	34.28150	38.50678	3169.40000
	BOILER GAS 2000 KBTU/HR	CT	503.98977	771.93916	503.98977	12202.45	43.24756	66.24212	43.24756	15032.92000
	BOILER GAS 10,000 KBTU/HR	CT	518.01415	4360.86115	518.01415	18322.83	44.50248	391.35213	44.50248	38160.69000
	BOILER COAL 10,000 KBTU/HR	CT	1483.2602	38346.56000	882.02724	70062.96	103.98820	0.00000	69.86437	63600.00000
	REPAIR BOILER									
	BOILER COAL 100,000 KBTU/H	CT	1798.2489	71516.33440	1022.5072	109818.25	125.17747	0.00000	80.45990	159000.00000
	REPAIR BOILER									
	BOILER OIL 250 KBTU/HR	CT	514.59994	278.57576	514.59994	11949.70	44.15802	23.90470	44.15802	27676.00000
	BOILER OIL 2000 KBTU/HR	CT	569.53753	278.57576	569.53753	13195.69	48.87224	23.90470	48.87224	3169.40000
	BOILER OIL 10,000 KBTU/HR	CT	627.10434	310.69206	627.10434	14535.42	53.81207	26.66061	53.81207	15032.92000
	BOILER GAS/OIL 2000 KBTU/H	CT	519.98350	478.28078	519.98350	12271.51	44.61999	41.04146	44.61999	18160.00000
	BOILER GAS/OIL 20000 KBTU	CT	543.19552	8617.02997	543.19552	20936.70	46.61182	739.43073	46.61182	18689.92000
	BOILER, PREHEAT. COAL SPREAD.									
	ASH HANDLING SYSTEM	CT	2361.6260	4757.08920	2267.1979	58016.60	192.63969	99.14442	192.63969	70651.30000
	FUEL OIL EQUIPMENT	CT	6370.3485	55695.14021	4352.3836	193717.16	316.63869	78.45989	316.63869	21200.00000
	CHEMICAL FEED SYSTEM	CT	9.99134	113.5129	4.99567	323.77	0.31695	0.00000	0.31695	302.10000
	FUEL OIL EQUIPMENT	CT	8.51682	140.98085	7.92792	332.26	0.62976	0.00000	0.62976	302.10000
	CHEMICAL FEED SYSTEM	CT	230.53524	998.77440	223.62548	6205.20	18.89293	0.00000	18.89293	2756.02000
	FEED-WATER SUPPLY	CT	289.71300	5478.08000	128.06050	11531.48	19.09530	0.00000	19.09530	389.02000
	DEAERATOR									
	See NOTES on the last page of this table for Explanation of Column Headings									

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 42

COMPONENT DESCRIPTION

Zone: 6

COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		Labor	Material	equipment	D.C. Total	labor	material	equipment	labor
BLOWOFF SYSTEM	CT	0.94224	53.39602	0.47112	73.26	0.00000	0.00000	0.00000	15
HOUSE FURN. GAS 25KBTU/HR	CT	51.57552	345.23299	49.69104	1508.94	4.10230	18.58179	2.10330	2.60000
HOUSE FURN. GAS 100KBTU/HR	CT	51.57552	430.06373	51.61153	1674.03	4.10230	22.23516	4.10330	10.40000
HOUSE FURN. GAS 200KBTU/HR	CT	55.38049	962.92414	51.61153	2206.90	4.10230	27.08572	4.10330	20.80000
HOUSE FURN. OIL 25KBTU/HR	CT	66.28957	614.88215	64.40509	2112.30	5.36492	26.39244	5.36492	10.40000
HOUSE FURN. OIL 100KBTU/HR	CT	70.05853	827.77980	66.28957	2406.25	5.36492	33.69181	5.36492	20.80000
HOUSE FURN. OIL 200KBTU/HR	CT	70.05853	970.85347	66.28957	2547.72	5.36492	33.69181	5.36492	20.80000
HOUSE FURN. ELECT 25KBTU/HR	CT	28.75485	344.61945	26.87237	1010.79	2.14422	12.59782	2.14422	10.40000
HOUSE FURN. ELECT 100KBTU/HR	CT	32.52581	483.64862	26.87237	1209.29	2.14422	18.14087	2.14422	10.40000
HOUSE FURN. ELECT 200KBTU/HR	CT	32.52581	617.32810	26.87237	1342.95	2.14422	23.30597	2.14422	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	5.20000
BASEBOARD RADIATOR 10 FT	CT	1.34368	59.98498	0.67184	88.31	0.00000	0.00000	0.00000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.34368	67.79124	0.67184	96.12	0.00000	0.00000	0.00000	2.60000
EXPANSION TANK	CT	0.07903	0.00000	0.07903	1.79	0.00678	0.00000	0.00678	5.0
STEAM CONVERTOR, <300,000	CT	12.54964	11.94220	12.54964	296.57	1.07689	0.00000	1.07689	3.47100
FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	347.04	0.86604	0.84169	0.86604	3.73500
STORAGE TANK, 24 GAL.	CT	20.68248	29.36465	20.68248	496.44	1.77477	0.86604	1.77477	3.73500
IND. FURN. GAS/OIL 500 MBTU	CT	53.34538	731.32275	44.09423	1911.59	4.57759	62.75509	3.78374	65.00000
IND. FURN. GAS/OIL 2000 MBTU	CT	85.24034	1520.45484	85.24034	3453.71	7.31451	130.47083	7.31451	184.00000
SURGE TANK, 1000 GAL	CT	1.88448	570.45384	0.94224	610.18	0.00000	0.00000	0.00000	5.20000
DIST. PIPING SYSTEM	TF	0.11778	0.06146	0.11778	2.73	0.01011	0.00527	0.01011	10.76450
PIPE/FITTINGS, ST. & C.I.	TF	0.14153	0.06502	0.14153	3.27	0.01216	0.00558	0.01216	10.76450
PIPE/FITTINGS, COPPER	TF	46.51117	1489.70463	26.24139	2473.31	0.16918	0.83189	0.16918	24.10000
PIPE INSULATION	CT	0.68489	4.20984	0.68489	19.74	0.05877	0.3125	0.05877	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.83548	4.85527	0.83548	23.61	0.04595	0.1942	0.04595	20.0
GATE VALVE, 2" - 3"	CT	0.32820	24.75409	0.32820	43.20	0.01548	0.03884	0.01548	20.0
DRAIN VALVE	CT	1.41676	11.1178	1.41676	43.20	0.0612	0.35829	0.0612	20.0
RADIATOR VALVE 1"	CT	0.51823	7.32947	0.51823	18.25	0.00000	0.00000	0.00000	1.43000
PRESSURE REDUCER VALVE 2"	CT	12.50574	401.67435	6.5287	685.30	0.00000	0.00000	0.00000	6.00000
STEAM TRAP, F & T, <1"	CT	9.88478	113.87931	9.88478	338.11	0.78285	4.79115	0.78285	7.30000
PIPE INSULATION	TF	0.68489	4.20984	0.68489	19.74	0.05877	0.3125	0.05877	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.72834	140.03137	3.72834	225.27	0.09193	0.47891	0.09193	15.0
CIRCULATION PUMP, 5 HP	CT	3.72834	521.97029	3.72834	604.77	0.09193	5.23422	0.09193	15.0
COND. COVR. 10 - 15 GAL.	CT	26.82915	603.63869	24.81563	1205.67	1.95631	9.49162	1.95631	15.60000
COOLING GENERATION EQUIPMENT	CT	54.21640	1796.96251	53.13305	3023.12	3.55916	0.00000	3.55916	8.38500
A/C DX PACKAGE 5T	CT	121.02059	6638.40032	117.50463	9371.90	9.02502	0.00000	9.02502	20.40000
REPAIR AIR CONDITIONER	CT	159.02297	19331.87508	149.77677	22908.93	11.56728	0.00000	11.56728	20.40000
A/C DX PACKAGE 20T	CT	24.12432	407.90506	24.12432	955.04	1.67669	0.13335	1.67669	10.0
A/C DX PACKAGE 50T	CT	24.52301	570.44546	24.52301	1126.63	1.67669	0.13335	1.67669	10.0
A/C WINDOW 1T	CT	59.90413	1145.55309	57.41236	2496.21	4.71276	0.64677	4.71276	10.0
A/C WINDOW 2T	CT	121.02059	6638.40032	117.50463	9371.90	9.02502	0.00000	9.02502	20.40000
A/C PAD MOUNTED 20 TON	CT	273.76938	5382.51994	135.03713	11147.67	21.99055	0.00000	21.99055	20.0
CHILLER-AIR COOL RECIP. 20T	CT	341.38711	10722.35050	166.00869	17903.80	28.00997	497.02053	14.02187	20.0
REPAIR HERMETIC CHILLER	CT	349.78511	25306.11670	167.06744	32654.55	27.32929	0.00000	13.66465	20.0
CHILLER AIR COOL REC. 50T	CT	151.90426	1976.99222	149.21690	5413.58	11.82151	0.00000	11.82151	20.0
CHILLER AIR COOL REC. 10T	CT	217.84239	3615.42468	108.02541	8204.68	17.16025	0.00000	8.58013	20.0
REPAIR HERMETIC CHILLER	CT	279.11087	6745.86809	137.70788	12623.61	22.24777	0.00000	11.12239	20.0

See NOTES on the last page of this table for Explanation of Column Headings

Zone: 6	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢ 7X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources				Annual Maintenance and Repair					Replacement and High Costs Tasks				
		Washington				D.C. Total					Equipment				
		UM	labor	material	equipment	labor	material	equipment	labor	material	yr	labor	material	equipment	
	REPAIR HERMETIC CHILLER	CT	272.31026	4894.03738	134.22359	10628.16	0.00000	11.12239	22.24477	0.00000	10	24.57000	9068.30000	12.28500	
	CHILLER WAT. COOL. REC. 20T	CT	280.84572	9819.81880	135.78477	15725.20	0.00000	11.12239	22.24477	0.00000	10	29.90000	9540.00000	7.47500	
	REPAIR HERMETIC CHILLER	CT	287.56412	21747.61720	136.69896	27786.80	0.00000	11.12239	22.24477	0.00000	10	10.53000	4778.48000	5.26500	
	CHILLER WAT. COOL. REC. 10T	CT	240.33234	3093.67360	118.82249	8155.58	0.00000	9.85126	19.70251	0.00000	20	48.10000	15900.00000	12.02500	
	REPAIR HERMETIC CHILLER	CT	287.56412	36109.19680	136.69896	42148.38	0.00000	11.12239	22.24477	0.00000	20	18.07000	11236.00000	6.02333	
	CHILLER WAT. COOL. REC. 200T	CT	402.38597	21115.53507	197.16195	29584.93	0.00000	11.12239	22.24477	0.00000	20	74.10000	27030.00000	18.52500	
	REPAIR HERMETIC CHILLER	CT	411.19150	49798.80880	199.29725	56446.57	0.00000	16.20691	32.41381	0.00000	20	20.80000	5300.00000	5.20000	
	CHILL. HERMETIC CENT. 300T	CT	428.25181	134164.12039	203.62841	143158.08	0.00000	16.20691	32.41381	0.00000	20	10.53000	5300.00000	18.52500	
	REPAIR CHILLER	CT	1024.6136	49798.80880	506.00830	71377.51	0.00000	42.26507	84.53014	0.00000	20	18.07000	29044.00000	4.51750	
	CHILL. OPEN CENT. 300T	CT	428.25181	134164.12039	203.62841	143158.08	0.00000	16.20691	32.41381	0.00000	20	20.80000	5300.00000	5.20000	
	REPAIR CHILLER	CT	463.31853	22167.81297	227.20833	31920.32	0.00000	18.74917	37.49833	0.00000	20	16.77000	19283.18000	14.70500	
	CHILL. DBL. RMOL. HERM. 100T	CT	481.85424	66156.91430	233.95678	76292.10	0.00000	18.74917	37.49833	0.00000	20	16.77000	19283.18000	14.70500	
	REPAIR CHILLER	CT	516.44759	137693.42749	246.71854	148543.33	0.00000	18.74917	37.49833	0.00000	20	16.77000	19283.18000	14.70500	
	CHILL. DBL. RMOL. HERM. 900T	CT	1317.3157	13465.98560	656.45886	41221.56	0.00000	55.61194	111.22387	0.00000	20	65.00000	37100.00000	16.25000	
	REPAIR CHILLER	CT	222.32561	19765.77760	104.44441	24430.90	0.00000	8.19879	16.39758	0.00000	20	104.00000	61480.00000	4.29000	
	CHILL. ONE STG. ABS. 300T	CT	238.78569	33187.07360	108.55943	38186.01	0.00000	8.19879	16.39758	0.00000	20	167.70000	113420.00000	41.92500	
	REPAIR CHILLER	CT	225.01297	21409.20160	105.11625	26128.83	0.00000	8.19879	16.39758	0.00000	20	114.40000	67840.00000	28.60000	
	CHILL. TWO STG. ABS. 300T	CT	229.82073	36391.75040	102.98521	41198.21	0.00000	7.81390	15.62780	0.00000	20	184.60000	125832.00000	4.29000	
	REPAIR CHILLER	CT	34.21956	619.22550	32.57064	1390.05	0.00000	2.65341	2.65341	0.00000	15	9.10000	821.50000	4.55000	
	AIR COOLED CONDENSER 5T	CT	38.43964	1269.64150	17.97350	2076.35	0.00000	1.32670	2.65341	0.00000	15	20.80000	2438.00000	6.93333	
	REPAIR CONDENSER 20T	CT	62.77786	2369.50598	28.56221	3683.82	0.00000	2.20837	4.41674	0.00000	15	31.20000	5294.70000	7.80000	
	AIR COOLED CONDENSER 50T	CT	68.43130	5632.17962	29.97557	7061.14	0.00000	2.20837	4.41674	0.00000	15	46.80000	10578.80000	11.70000	
	REPAIR CONDENSER 100T	CT	71.93446	2460.55945	31.72715	3933.37	0.00000	7.187059	14.37865	0.00000	15	52.00000	10070.00000	13.00000	
	COOLING TOWER 50T	CT	182.43644	4486.91905	86.50702	8317.60	0.00000	7.187059	14.37865	0.00000	15	46.80000	10070.00000	13.00000	
	REPAIR TOWER 300T	CT	218.27931	7675.45735	102.07285	12254.17	0.00000	16.30501	16.30501	0.00000	15	128.70000	16377.00000	19.50000	
	COOLING TOWER 900T	CT	252.79843	17375.09335	114.73920	22666.78	0.00000	8.84525	17.69049	0.00000	15	78.00000	10070.00000	13.00000	
	EVAPORATIVE CONDENSER 20T	CT	115.41312	1886.99160	54.40872	4309.35	0.00000	8.84525	17.69049	0.00000	15	78.00000	10070.00000	13.00000	
	REPAIR CONDENSER 100T	CT	198.67796	4528.79487	90.26992	8687.91	0.00000	6.96788	13.93576	0.00000	15	100.10000	3048.80000	25.10000	
	EVAPORATIVE CONDENSER 300T	CT	109.46640	13095.00369	38.24400	15349.79	0.00000	6.96788	13.93576	0.00000	15	182.00000	31895.00000	45.50000	
	EXPANSION TANK	CT	0.07903	0.00000	0.07903	1.79	0.00000	0.00000	0.00000	0.00000	50	3.71000	135.68000	1.73500	
	REFRIG. FAN COIL 1T	CT	9.36156	346.70671	8.89044	557.52	0.00000	0.72327	0.72327	0.00000	15	2.60000	835.42000	1.30000	
	REFRIG. FAN COIL 3T	CT	9.45578	445.66725	8.93755	658.47	0.00000	0.72327	0.72327	0.00000	15	2.60000	1051.52000	1.40000	
	REFRIG. FAN COIL 5T	CT	9.59712	585.24773	9.00822	801.03	0.00000	0.72327	0.72327	0.00000	15	3.25000	1240.20000	1.62500	
	DIST. PIPING SYSTEM	TF	0.24918	0.13003	0.24918	5.78	0.00000	0.02138	0.02138	0.00000	30	10.74450	41.34000	5.37225	
	PIPE/FITTINGS ST. & C.I.	TF	1.52821	13.22336	0.81102	45.59	0.00000	0.00000	0.00000	0.00000	20	5.55100	51.00720	2.77500	
	PIPE/FITTINGS COPPER	TF	46.51117	1532.23267	24.24139	2526.03	0.00000	0.83189	0.83189	0.00000	25	241.80000	8321.00000	120.90000	
	PIPE AND FITTINGS, PVC	CT	0.35777	4.85577	0.35777	32.97	0.00000	0.01942	0.01942	0.00000	20	0.68900	17.91400	0.68900	
	GATE VALVE 3/8" - 1 1/2"	CT	0.32820	24.2669	0.32820	35.20	0.00000	0.01562	0.01562	0.00000	20	0.57200	94.05380	0.57200	
	GATE VALVE 2" - 3"	CT	1.41476	11.1178	1.41476	45.20	0.00000	0.55629	0.55629	0.00000	20	0.68900	17.91400	0.68900	
	DRAIN VALVE	CT	1.41476	11.1178	1.41476	45.20	0.00000	0.55629	0.55629	0.00000	20	0.68900	17.91400	0.68900	

See notes on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 44

COMPONENT DESCRIPTION

Zone: 6

UM	By Resources	Washington	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				Replacement and High Costs Tasks			
			Labor	material	equipment	yr	Labor	material	equipment	
PIPE INSULATION	0.68489	19.53	0.05877	0.34282	0.05877	30	0.05877	0.34282	0.05877	91.00000
CIRCULATOR PUMP, < 1 HP	3.73022	224.63	0.18951	0.47891	0.18951	15	0.18951	0.47891	0.18951	4.19000
5 TON CHILLER ACH RECIP	7.89006	691.87	0.19193	5.23422	0.19193	15	0.19193	5.23422	0.19193	7.80000
HEAT/COOL GENERATION EQUIPMENT										
MULTI-ZONE 6500 CFM	95.00068	4993.26	7.02011	68.00268	4.45470	15	36.40000	5997.48000	9.10000	9.10000
MULTI-ZONE 10,000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	42.90000	8050.70000	10.72500	10.72500
MULTI-ZONE 25,000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	75.40000	15359.40000	18.85000	18.85000
MULTI-ZONE 50,000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
MULTI-ZONE 2500 CFM	91.23192	4103.26	7.02011	52.84416	4.45470	15	26.40000	5260.00000	6.30000	6.30000
DUAL DUCT 6500 CFM	91.53308	4962.31	6.89415	68.00268	4.39172	15	36.40000	5997.48000	9.10000	9.10000
DUAL DUCT 10,000 CFM	95.83868	5930.82	6.89415	83.16120	4.39172	15	42.90000	8050.70000	10.72500	10.72500
DUAL DUCT 25,000 CFM	112.70709	9487.83	7.27201	149.25049	4.75413	15	75.40000	15359.40000	18.85000	18.85000
DUAL DUCT 50,000 CFM	127.30926	14608.99	7.64987	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
3 DK MULTI ZONE 6500 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
3 DK MULTI ZONE 10,000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
3 DK MULTI ZONE 25,000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
3 DK MULTI ZONE 50,000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
D.D. VARI. VOL. 6500 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
D.D. VARI. VOL. 10000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
D.D. VARI. VOL. 25000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
D.D. VARI. VOL. 50000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
VARIABLE VOLUME 6500 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
VARIABLE VOLUME 10000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
VARIABLE VOLUME 25000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
VARIABLE VOLUME 50000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
TERM. REHEAT 6500 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
TERM. REHEAT 10000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
TERM. REHEAT 25000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
TERM. REHEAT 50000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
2 PIPE IMBUCTION 6500 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
2 PIPE IMBUCTION 10000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
2 PIPE IMBUCTION 25000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
2 PIPE IMBUCTION 50000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
4 PIPE IMBUCTION 6500 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
4 PIPE IMBUCTION 10000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
4 PIPE IMBUCTION 25000 CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
4 PIPE IMBUCTION 50000 CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
2 PIPE FAN COIL 200 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
2 PIPE FAN COIL 400 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
2 PIPE FAN COIL 600 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
2 PIPE FAN COIL 1200 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
4 PIPE FAN COIL 200 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
4 PIPE FAN COIL 400 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
4 PIPE FAN COIL 600 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
4 PIPE FAN COIL 1200 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
UNIT VENT 400 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
UNIT VENT 1200 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
SIN. ZONE DRAW THRU 6500CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
SIN. ZONE DRAW THRU 10000CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
SIN. ZONE DRAW THRU 25000CFM	118.53786	9741.75	7.39797	151.22233	4.81711	15	105.30000	27105.40000	26.32500	26.32500
SIN. ZONE DRAW THRU 50000CFM	128.77706	14639.93	7.7582	172.61130	5.19497	15	105.30000	27105.40000	26.32500	26.32500
SIN. ZONE DRAWTHRU 1000CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
SIN. ZONE DRAWTHRU 2500CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
UNIT HEATER 400 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
UNIT HEATER 1200 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000
UNIT HEATER 4000 CFM	97.35648	5960.81	7.02011	83.07904	4.45470	15	75.40000	15359.40000	18.85000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 45

Zone: 6	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		UM	Labor	material	equipment	D.C. Total	Labor	material	equipment	yr	Labor	material	equipment	yr	Labor	material	equipment	yr	Labor	material	equipment
Zone: 6	UNIT HEATER 8000 CFM	CT	22.44726	589.03267	21.85836	1096.25	1.82514	10.98887	1.82514	15	3.25000	1272.00000	1.82514	15	3.25000	1272.00000	1.82514	15	3.25000	1272.00000	1.82514
	GASFIRED RADIANT HTR 50W8H	CT	15.62028	161.34048	15.16916	514.10	1.25953	0.00000	1.25953	15	2.60000	443.20000	1.25953	15	2.60000	443.20000	1.25953	15	2.60000	443.20000	1.25953
	HEAT PUMP 5T	CT	55.53798	3214.78698	54.45443	4470.92	4.57981	209.46387	4.57981	20	6.38500	2994.50000	4.57981	20	6.38500	2994.50000	4.57981	20	6.38500	2994.50000	4.57981
	HEAT PUMP 10T	CT	120.74334	6167.03368	118.25993	8898.06	10.04567	396.35907	10.04567	20	16.30000	5969.00000	10.04567	20	16.30000	5969.00000	10.04567	20	16.30000	5969.00000	10.04567
	HEAT PUMP 25T	CT	151.73350	16640.56098	147.95440	20089.78	12.58793	1035.94067	12.58793	20	19.50000	17755.00000	12.58793	20	19.50000	17755.00000	12.58793	20	19.50000	17755.00000	12.58793
	HEAT PUMP 1T	CT	51.89484	462.31209	51.17933	1637.00	4.33032	11.26661	4.33032	20	5.33800	1272.00000	4.33032	20	5.33800	1272.00000	4.33032	20	5.33800	1272.00000	4.33032
	DUCT/COIL 1-ROW H.W. 12x24	CT	30.25043	14.83915	15.12521	652.52	2.55881	0.00000	2.55881	25	2.34000	80.56000	2.55881	25	2.34000	80.56000	2.55881	25	2.34000	80.56000	2.55881
	VENTILATION SYSTEM	CT	57.08342	986.58489	52.04482	2265.11	4.32184	21.43399	4.32184	20	26.00000	2851.40000	4.32184	20	26.00000	2851.40000	4.32184	20	26.00000	2851.40000	4.32184
	FIXTURES	CT	57.87636	1017.87759	52.44109	2313.12	4.38989	22.37995	4.38989	20	26.00000	2929.84000	4.38989	20	26.00000	2929.84000	4.38989	20	26.00000	2929.84000	4.38989
	EXHAUST SYSTEM	CT	57.87636	1017.87759	52.44109	2313.12	4.38989	22.37995	4.38989	20	26.00000	2929.84000	4.38989	20	26.00000	2929.84000	4.38989	20	26.00000	2929.84000	4.38989
Zone: 6	EXHAUST EQUIPMENT	CT	4.68445	18.51984	4.68445	125.16	0.32991	0.70146	0.32991	20	3.25000	41.58380	0.32991	20	3.25000	41.58380	0.32991	20	3.25000	41.58380	0.32991
	EXHAUST FAN <200 CFM	CT	16.68535	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	1.31649	20	5.20000	296.80000	1.31649	20	5.20000	296.80000	1.31649
	EXHAUST FAN 1000 CFM	CT	57.87636	727.28545	52.44109	2022.51	4.38989	22.37995	4.38989	20	26.00000	1805.18000	4.38989	20	26.00000	1805.18000	4.38989	20	26.00000	1805.18000	4.38989
	EXHAUST FAN 25,000 CFM	CT	57.87636	1857.15455	52.25858	3071.81	4.38989	68.16838	4.38989	20	26.00000	4112.80000	4.38989	20	26.00000	4112.80000	4.38989	20	26.00000	4112.80000	4.38989
	EXHAUST FAN 50,000 CFM	CT	59.55596	2218.25733	52.26099	3547.56	4.38989	70.48010	4.38989	20	32.50000	5406.00000	4.38989	20	32.50000	5406.00000	4.38989	20	32.50000	5406.00000	4.38989
	EXHAUST FAN, 5000 CFM	CT	19.50507	432.83597	17.15916	867.70	1.32783	0.94506	1.32783	20	15.60000	1632.40000	1.32783	20	15.60000	1632.40000	1.32783	20	15.60000	1632.40000	1.32783
	AIR CURTAIN, 1000 CFM	CT	5.10845	211.84227	5.10845	327.70	0.36629	2.90079	0.36629	20	3.25000	689.00000	0.36629	20	3.25000	689.00000	0.36629	20	3.25000	689.00000	0.36629
	FIXTURES	CT	5.10845	211.84227	5.10845	327.70	0.36629	2.90079	0.36629	20	3.25000	689.00000	0.36629	20	3.25000	689.00000	0.36629	20	3.25000	689.00000	0.36629
	METAL FLUE/CHIMNEY	LF	3.29784	44.94485	1.64892	114.46	0.00000	0.00000	0.00000	15	9.10000	124.02000	0.00000	15	9.10000	124.02000	0.00000	15	9.10000	124.02000	0.00000
	SPECIAL SYSTEM	CT	7.66714	71.02445	7.66714	244.92	0.64937	0.51557	0.64937	10	0.13000	84.80000	0.64937	10	0.13000	84.80000	0.64937	10	0.13000	84.80000	0.64937
Zone: 6	HUMIDITY CONTROL SYSTEM	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	1.27113	20	0.78000	187.22780	1.27113	20	0.78000	187.22780	1.27113
	ROOM HUMIDIFIER, FLOOR TYPE	CT	14.75048	76.87348	14.75048	411.41	1.21443	0.00000	1.21443	20	0.78000	100.26540	1.21443	20	0.78000	100.26540	1.21443	20	0.78000	100.26540	1.21443
	CONTROLS/INSTRUMENT	CT	14.93071	36.25551	14.93071	375.56	1.25953	0.00000	1.25953	15	0.78000	100.04280	1.25953	15	0.78000	100.04280	1.25953	15	0.78000	100.04280	1.25953
	DEVICES	CT	15.01479	19.92652	15.01479	360.46	1.27113	0.00000	1.27113	20	0.78000	77.11500	1.27113	20	0.78000	77.11500	1.27113	20	0.78000	77.11500	1.27113
	THERMOSTATS/PNEUMATICS	CT	14.75048	34.90555	14.75048	369.45	1.21443	0.00000	1.21443	20	0.78000	45.52700	1.21443	20	0.78000	45.52700	1.21443	20	0.78000	45.52700	1.21443
	HUMIDITY SENSOR	CT	15.01479	15.0472	15.01479	355.40	1.27113	0.00000	1.27113	20	0.78000	58.30000	1.27113	20	0.78000	58.30000	1.27113	20	0.78000	58.30000	1.27113
	FLOW SENSOR	CT	15.01479	104.08382	15.01479	438.95	1.27113	0.00000	1.27113	20	0.78000	287.20700	1.27113	20	0.78000	287.20700	1.27113	20	0.78000	287.20700	1.27113
	RADIATION SENSOR	CT	14.75048	15.0472	14.75048	355.40	1.21443	0.00000	1.21443	20	0.78000	58.30000	1.21443	20	0.78000	58.30000	1.21443	20	0.78000	58.30000	1.21443
	WIND VELOCITY SENSOR	CT	15.01479	104.08382	15.01479	438.95	1.27113	0.00000	1.27113	20	0.78000	287.20700	1.27113	20	0.78000	287.20700	1.27113	20	0.78000	287.20700	1.27113
	PRESSURE SENSOR	CT	15.01479	104.08382	15.01479	438.95	1.27113	0.00000	1.27113	20	0.78000	287.20700	1.27113	20	0.78000	287.20700	1.27113	20	0.78000	287.20700	1.27113
	DANGER CONTROLLER/ELECT.	CT	51.81112	1175.19147	51.81112	2294.33	4.38778	4.38778	4.38778	25	3.67900	6103.82980	4.38778	25	3.67900	6103.82980	4.38778	25	3.67900	6103.82980	4.38778

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/TX)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Annual Maintenance and Repair			Replacement and High Costs Tasks			
		labor	material	equipment	labor	material	equipment	yr	labor	material	equipment
Zone: 7											
HVAC											
NATURAL GAS SYSTEM											
EQUIPMENT											
GAS METER	CT	0.13209	33.38905	0.13209	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM											
PIPE/FITTINGS, STEEL/IRON	TF	7.52975	13.51943	3.76487	0.64613	1.16014	0.32307	66	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, 1/2"	CT	0.38045	11.43274	0.38045	0.00000	0.00000	0.01928	12	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.59855	193.72136	0.41160	0.01928	0.00000	0.01928	12	0.62400	323.30000	0.31200
FUEL OIL SYSTEM											
STORAGE SYSTEMS											
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	26	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	0.10400	3.99188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23584	0.72663	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM											
PIPE/FITTINGS, COPPER	TF	14.32617	254.56868	7.24060	0.15425	0.28872	0.08378	22	55.51000	1113.00000	27.75500
LPG SYSTEM											
STORAGE SYSTEM											
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	26	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM											
PIPE/FITTINGS, STEEL/IRON	TF	7.52975	13.51943	3.76487	0.64613	1.16014	0.32307	66	1074.4500	1929.20000	537.22500
STEAM CENTRAL											
PRESS. RED. / REG. SYSTEM	CT	16.24752	178.06904	15.52239	1.26976	1.20668	1.26976	23	7.35800	832.10000	3.67800
STEAM CONVECTOR, <300, 000	CT	16.13404	105.90505	14.05047	1.02688	0.98213	1.02688	12	6.50000	117.36000	3.25000
STEAM REG. VALVE 2"	CT	16.24506	521.78091	8.12253	0.80000	20.86452	0.80000	26	7.80000	250.53100	3.90000
COND. METER, <300 #/HR.	CT	7.95886	243.14672	7.95886	0.63295	0.00000	0.63295	26	0.65000	1007.00000	0.65000
VALVES											
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500
EQUIPMENT											
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.76124	78.62582	0.88062	0.00000	0.00000	0.00000	15	3.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.76124	88.85795	0.88062	0.00000	0.00000	0.00000	15	3.20000	282.35000	2.60000
SOLAR											
EQUIPMENT											
SOLAR PANEL, 3' X 8'	CT	1.51242	135.65244	0.75621	0.00000	0.00000	0.00000	13	3.90000	349.80000	1.95000
SOLAR STORAGE TANK, 1000GAL	CT	4.61604	649.26378	2.30802	0.00000	0.00000	0.00000	18	15.60000	2194.20000	7.80000
PIPING SYSTEM											
PIPE/FITTINGS, PVC	TF	0.29526	1.53776	0.24819	0.02534	0.13196	0.02130	33	41.70530	669.12500	20.85265
HEATING GENERATION											
EQUIPMENT											
BOILER GAS 250 KBTU/HR	CT	456.53057	1161.96360	450.12482	38.07571	46.10205	38.07571	23	65.00000	3159.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	532.61523	4001.12563	505.35673	42.58174	89.08295	42.58174	23	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	560.55994	13452.55100	523.76734	43.89572	526.29359	43.89572	23	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	5646.7376	175618.68000	1709.2264	102.22482	0.00000	68.67816	15	1050.4000	636000.00000	4160.0000
REPAIR BOILER											
BOILER COAL 100,000 KBTU/H	CT	10078.379	407129.64420	2672.8414	123.05570	0.00000	79.09360	23	41500.000	1590000.00000	8320.0000
REPAIR BOILER											
BOILER OIL 250 KBTU/HR	CT	526.19059	999.31974	516.58196	44.05326	32.14723	44.05326	23	65.00000	276766.00000	378.45000
BOILER OIL 2000 KBTU/HR	CT	594.53321	3337.61953	572.24471	48.32400	32.14723	48.32400	23	184.60000	3169.40000	16.25000
BOILER OIL 10,000 KBTU/HR	CT	668.75948	7939.13727	631.99588	53.18028	35.85341	53.18028	23	248.69000	15032.92000	46.15000
BOILER GAS/OIL 2000 KBTU/H	CT	551.52362	4328.97919	524.23532	44.20429	55.19290	44.20429	23	184.60000	38160.00000	62.17250
BOILER GAS/OIL 20000 KBTU	CT	666.50643	25586.29549	570.22800	40394.57	994.39259	46.17759	23	651.30000	18489.92000	42.15000
BOILER-PNEUMAT. COAL SPREAD.	CT	2361.69533	5790.90879	2246.2939	156.15780	118.58159	185.44779	9	364.00000	71020.00000	162.82500
ASH HANDLING SYSTEM	CT	7182.0473	73205.86066	4536.4398	314.02891	120.25989	313.70734	12	10400.000	212000.00000	470.00000
FUEL OIL EQUIPMENT	CT	11.24975	198.13043	5.62487	0.82321	0.34221	0.81116	15	2.60000	2000.00000	2600.00000
CHEMICAL FEED SYSTEM	CT	9.24144	249.40072	8.19965	0.61422	0.00000	0.61422	12	3.25000	389.02000	1.30000
FEED-WATER SUPPLY	CT	233.07141	1766.87160	220.84777	18.42658	0.00000	18.42658	12	28.60000	2756.00000	9.53333
DEAERATOR	CT	309.20117	7180.44000	132.58508	18.97604	0.00000	9.48802	15	1260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION

Zone: 7

PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G+ 7%)		ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington				
		Labor		material	equipment	D.C. Total	Labor		material	equipment	yr
						Washington					yr
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COMPONENT DESCRIPTION	Zone: 7	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/yr 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		labor	material	equipment	D.C. Total	labor	material	equipment	Yr
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352	64
CHILL. OPEN CENT. 900T	CT	366.30358	0.00000	193.15179	8143.28	33.14806	0.00000	16.57433	64
CHILL. DBL. BMDL. HERN. 100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	64
CHILL. DBL. BMDL. HERN. 300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	64
CHILL. DBL. BMDL. HERN. 900T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305	64
CHILL. ONE STG. ABS. 100T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.36471	64
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.36471	64
CHILL. ONE STG. ABS. 900T	CT	181.78992	0.00000	90.89496	3832.13	15.59946	0.00000	7.79973	64
CHILL. TWO STG. ABS. 300T	CT	27.26849	0.00000	13.63424	618.15	2.33992	0.00000	1.16996	48
CHILL. TWO STG. ABS. 900T	CT	27.26849	0.00000	13.63424	618.15	2.33992	0.00000	1.16996	48
AIR COOLED CONDENSER 20T	CT	48.47731	0.00000	24.23866	1051.90	4.15964	0.00000	2.07933	48
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1051.90	4.15964	0.00000	2.07933	48
AIR COOLED CONDENSER 100T	CT	53.02206	0.00000	26.51103	1117.71	4.54964	0.00000	2.27622	48
COOLING TOWER 30T	CT	165.12594	0.00000	82.56292	3480.85	14.16951	0.00000	7.08476	48
COOLING TOWER 100T	CT	192.39433	0.00000	96.19717	4055.67	16.50433	0.00000	8.25472	48
COOLING TOWER 300T	CT	209.05841	0.00000	104.52920	4206.93	17.91971	0.00000	8.95966	48
EVAPORATIVE CONDENSER 20T	CT	96.95462	0.00000	48.47731	2043.80	8.31971	0.00000	4.15966	48
EVAPORATIVE CONDENSER 100T	CT	159.06518	0.00000	79.53309	3533.12	13.64933	0.00000	6.82477	48
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.11969	0.00000	1.55995	48
EXPANSION TANK	CT	0.10074	0.00000	0.10074	2.28	0.00864	0.00000	0.00864	39
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	48
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	48
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	48
PIPE/FITTINGS ST. & C.I.	TF	2.41697	8.30426	1.35810	59.73	0.02568	0.01340	0.02568	23
PIPE/FITTINGS COPPER	TF	2.02395	17.34221	1.08388	60.24	0.01234	0.00567	0.01234	15
PIPE AND FITTINGS, PVC	TF	1.74760	8.59434	1.74760	48.23	0.01234	0.00567	0.01234	15
GATE VALVE, 3/8" - 1 1/2"	CT	0.50885	6.14333	0.50885	17.96	0.02364	0.02976	0.02364	15
GATE VALVE, 2" - 3"	CT	0.47024	32.54973	0.47024	43.21	0.02364	0.02976	0.02364	15
DRAIN VALVE	CT	1.80119	14.75420	1.80119	55.61	0.13454	0.04558	0.13454	15
PIPE INSULATION	VF	18.74257	182.29134	18.74257	607.37	0.06920	0.40367	0.06920	23
CIRCULATOR PUMP, < 1 HP	CT	5.03309	243.76496	5.03309	337.92	0.20089	0.50773	0.20089	12
5 TON CHILLER ACH RECIP	CT	12.37510	886.07476	7.37452	1150.74	0.20371	6.05783	0.20371	12
HEAT/COOL GENERATION EQUIPMENT	CT	93.32209	2689.71701	54.83317	4683.10	7.01911	67.86871	4.45803	16
MULTI-ZONE 6500 CFM	CT	95.37099	3516.17303	55.54764	5531.29	7.01911	67.86871	4.45803	16
MULTI-ZONE 10,000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
MULTI-ZONE 25,000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
MULTI-ZONE 50,000 CFM	CT	83.32038	620.00008	53.02206	3212.84	7.14975	53.21017	4.39984	16
DUAL DUCT 6500 CFM	CT	91.84833	3517.17011	54.09629	5521.03	6.89264	67.86871	4.39480	16
DUAL DUCT 10,000 CFM	CT	93.90623	3517.13438	54.01076	5521.18	6.89264	67.86871	4.39480	16
DUAL DUCT 25,000 CFM	CT	108.61700	6397.47574	61.48089	8910.07	6.89264	67.86871	4.39480	16
DUAL DUCT 50,000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.27203	148.85441	4.76359	16
3 DK. MULTI ZONE 6500 CFM	CT	95.37099	2689.70694	54.32448	4686.05	7.01911	67.86871	4.45803	16
3 DK. MULTI ZONE 10,000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
3 DK. MULTI ZONE 25,000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
3 DK. MULTI ZONE 50,000 CFM	CT	83.32038	620.00008	53.02206	3212.84	7.14975	53.21017	4.39984	16
D.D. VARI. VOL. 6500 CFM	CT	91.84833	3517.17011	54.09629	5521.03	6.89264	67.86871	4.39480	16
D.D. VARI. VOL. 10000 CFM	CT	93.90623	3517.13438	54.01076	5521.18	6.89264	67.86871	4.39480	16
D.D. VARI. VOL. 25000 CFM	CT	108.61700	6397.47574	61.48089	8910.07	6.89264	67.86871	4.39480	16
D.D. VARI. VOL. 50000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.27203	148.85441	4.76359	16
VARIABLE VOLUME 6500 CFM	CT	95.37099	2689.70694	54.32448	4686.05	7.01911	67.86871	4.45803	16
VARIABLE VOLUME 10000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
VARIABLE VOLUME 25000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
VARIABLE VOLUME 50000 CFM	CT	83.32038	620.00008	53.02206	3212.84	7.14975	53.21017	4.39984	16
VARIABLE VOLUME 6500 CFM	CT	91.84833	3517.17011	54.09629	5521.03	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 10000 CFM	CT	93.90623	3517.13438	54.01076	5521.18	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 25000 CFM	CT	108.61700	6397.47574	61.48089	8910.07	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 50000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.27203	148.85441	4.76359	16
VARIABLE VOLUME 6500 CFM	CT	95.37099	2689.70694	54.32448	4686.05	7.01911	67.86871	4.45803	16
VARIABLE VOLUME 10000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
VARIABLE VOLUME 25000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
VARIABLE VOLUME 50000 CFM	CT	83.32038	620.00008	53.02206	3212.84	7.14975	53.21017	4.39984	16
VARIABLE VOLUME 6500 CFM	CT	91.84833	3517.17011	54.09629	5521.03	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 10000 CFM	CT	93.90623	3517.13438	54.01076	5521.18	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 25000 CFM	CT	108.61700	6397.47574	61.48089	8910.07	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 50000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.27203	148.85441	4.76359	16
VARIABLE VOLUME 6500 CFM	CT	95.37099	2689.70694	54.32448	4686.05	7.01911	67.86871	4.45803	16
VARIABLE VOLUME 10000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
VARIABLE VOLUME 25000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
VARIABLE VOLUME 50000 CFM	CT	83.32038	620.00008	53.02206	3212.84	7.14975	53.21017	4.39984	16
VARIABLE VOLUME 6500 CFM	CT	91.84833	3517.17011	54.09629	5521.03	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 10000 CFM	CT	93.90623	3517.13438	54.01076	5521.18	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 25000 CFM	CT	108.61700	6397.47574	61.48089	8910.07	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 50000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.27203	148.85441	4.76359	16
VARIABLE VOLUME 6500 CFM	CT	95.37099	2689.70694	54.32448	4686.05	7.01911	67.86871	4.45803	16
VARIABLE VOLUME 10000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
VARIABLE VOLUME 25000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
VARIABLE VOLUME 50000 CFM	CT	83.32038	620.00008	53.02206	3212.84	7.14975	53.21017	4.39984	16
VARIABLE VOLUME 6500 CFM	CT	91.84833	3517.17011	54.09629	5521.03	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 10000 CFM	CT	93.90623	3517.13438	54.01076	5521.18	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 25000 CFM	CT	108.61700	6397.47574	61.48089	8910.07	6.89264	67.86871	4.39480	16
VARIABLE VOLUME 50000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.27203	148.85441	4.76359	16
VARIABLE VOLUME 6500 CFM	CT	95.37099	2689.70694	54.32448	4686.05	7.01911	67.86871	4.45803	16
VARIABLE VOLUME 10000 CFM	CT	110.09076	6420.54799	62.21777	8964.21	7.39850	130.00423	4.58032	16
VARIABLE VOLUME 25000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20682	16
VARIABLE VOLUME 50000 CFM	CT	83.32038							

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 49
Zone: 7	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/Hr)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
		By Resources				Annual Maintenance and Repair			Replacement and High Costs Tasks				
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
CT	VARIABLE VOLUME 5000 CFM	122.50462	10641.31550	68.39227	13246.56	7.65112	171.30848	5.15358	16	105.30000	27305.60000	26.32500	
CT	TERM. REHEAT 6500 CFM	62.86410	2451.51572	57.26460	7434.20	6.88719	67.96854	4.38612	13	32.50000	4279.22000	8.12500	
CT	TERM. REHEAT 10000 CFM	94.88046	3345.28073	57.78908	5389.22	6.88719	67.96854	4.38612	13	37.70000	6181.92000	9.42500	
CT	TERM. REHEAT 25000 CFM	112.58160	7662.26703	52.43949	10051.27	7.26420	149.20515	4.76313	13	71.50000	15274.60000	17.87500	
CT	TERM. REHEAT 50000 CFM	132.90779	10876.41289	70.86612	13692.23	7.64121	172.80384	5.14013	13	113.10000	22853.60000	28.27500	
CT	2 PIPE INDUCTION 6000 CFM	92.86410	2451.51572	54.76908	4434.20	6.88719	67.96854	4.38612	13	32.50000	4279.22000	8.12500	
CT	2 PIPE INDUCTION 10000 CFM	112.58160	3363.68073	52.43949	5389.22	6.88719	67.96854	4.38612	13	37.70000	6181.92000	9.42500	
CT	2 PIPE INDUCTION 25000 CFM	132.90779	7662.26703	70.86612	10051.27	7.64121	149.20515	4.76313	13	71.50000	15274.60000	17.87500	
CT	2 PIPE INDUCTION 5000 CFM	81.80546	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	32.50000	4279.22000	8.12500	
CT	4 PIPE INDUCTION 10000 CFM	121.80546	1266.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	37.70000	6181.92000	9.42500	
CT	4 PIPE INDUCTION 25000 CFM	161.80546	1706.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	42.90000	8194.04000	10.87500	
CT	4 PIPE INDUCTION 5000 CFM	90.89496	2000.34036	61.35410	3621.14	7.09773	150.79042	5.26482	48	113.10000	22853.60000	28.27500	
CT	2 PIPE FAN COIL 200 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.60000	694.30000	1.30000	
CT	2 PIPE FAN COIL 400 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.60000	694.30000	1.30000	
CT	2 PIPE FAN COIL 600 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.60000	694.30000	1.30000	
CT	2 PIPE FAN COIL 1200 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.60000	694.30000	1.30000	
CT	UNIT VENT 400 CFM	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	UNIT VENT 1200 CFM	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	SIN. ZONE DRAIN THRU 6500CFM	81.80546	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	32.50000	4279.22000	8.12500	
CT	SIN. ZONE DRAIN THRU 10000CFM	81.80546	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	32.50000	4279.22000	8.12500	
CT	SIN. ZONE DRAIN THRU 25000CFM	81.80546	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	32.50000	4279.22000	8.12500	
CT	SIN. ZONE DRAIN THRU 50000CFM	81.80546	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	32.50000	4279.22000	8.12500	
CT	SIN. ZONE DRAIN THRU 1000CFM	83.30466	2000.34036	61.35410	3621.14	7.09773	150.79042	5.26482	48	113.10000	22853.60000	28.27500	
CT	SIN. ZONE DRAIN THRU 2500CFM	83.30466	2000.34036	61.35410	3621.14	7.09773	150.79042	5.26482	48	113.10000	22853.60000	28.27500	
CT	UNIT HEATER 400 CFM	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	UNIT HEATER 1200 CFM	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	UNIT HEATER 4000 CFM	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	UNIT HEATER 8000 CFM	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	GASFIRED RADIANT HTR 50MBH	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1526.40000	1.43000	
CT	HEAT PUMP 5T	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	64	8.38500	2994.50000	4.19250	
CT	HEAT PUMP 10T	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	64	14.30000	5989.00000	4.76567	
CT	HEAT PUMP 25T	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	64	19.50000	7755.00000	4.87500	
CT	HEAT PUMP 50T	171.85736	0.00000	171.85736	3882.24	15.82959	0.00000	15.82959	64	24.50000	9994.00000	5.12500	
CT	DUCT/COIL 1-ROW H.W.12X24	51.24579	411.98972	0.62083	1572.24	2.30017	10.71766	4.29017	22	5.33800	1272.00000	2.76900	
CT	VENTILATION SYSTEM	30.59832	0.00000	15.14916	638.69	2.59991	0.00000	2.59991	27	2.34000	80.56000	1.17000	
CT	FIXTURES												
CT	FORCE DRAFT FAN 10,000 CFM	57.89267	1092.69036	52.12262	2387.23	4.30762	21.34345	4.30762	18	26.00000	2851.40000	6.50000	
CT	2NO DRAFT FAN 10000 CFM	56.74115	1127.69664	52.54686	2440.12	4.38063	22.37366	4.38063	18	26.00000	2929.84000	6.50000	
CT	EXHAUST SYSTEM												
CT	EQUIPMENT												
CT	EXHAUST FAN <200 CFM	5.83643	24.09965	5.83643	156.42	0.40620	0.85941	0.40620	15	3.25000	41.58380	3.25000	
CT	EXHAUST FAN 1000 CFM	16.68555	67.71695	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000	
CT	EXHAUST FAN 10,000 CFM	60.03169	876.33417	52.81934	2214.77	4.37688	22.73286	4.37688	15	26.00000	1805.18000	6.50000	
CT	EXHAUST FAN 25,000 CFM	82.23354	2196.36339	72.81429	3454.78	4.39368	68.93587	2.19784	15	26.00000	4112.80000	6.50000	
CT	EXHAUST FAN 50,000 CFM	107.55904	2675.65553	53.36973	4058.74	4.39368	72.47918	4.34353	15	32.50000	5406.00000	8.12500	
CT	EXHAUST FAN 3000 CFM	18.99430	378.73646	16.92503	802.91	1.32778	0.88417	1.30128	22	15.60000	1632.40000	7.80000	
CT	AIR CURTAIN, 1000 CFM	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	64	3.25000	689.00000	3.25000	
CT	FIXTURES												
LF	METAL FLUE/CHIMNEY	3.52898	48.09496	1.76449	122.49	0.00000	0.00000	0.00000	13	9.10000	124.02000	4.55000	
CT	SPECIAL SYSTEM												
CT	HUMIDITY CONTROL SYSTEM												
CT	ROOM HUMIDIFIER, FLOOR TYPE												
CT	CONTROLS/INSTRUMENT												
CT	See NOTES on the last page of this table for Explanation of Column Headings												

See NOTES on the last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 51		
Zone. 8	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources			Washington D.C. Total	Annual Maintenance and Repair						Replacement and High Costs Tests			
		UM	Labor			material	equipment	yr	labor	material	equipment				
HVAC	NATURAL GAS SYSTEM														
	EQUIPMENT														
	GAS METER	CT	0.13209	33.30905	0.13209					0.00000	0.00000	16	0.39000	98.58000	0.39000
	PIPING SYSTEM	TF	0.29767	14.02242	4.17877					1.27192	0.35858	62	1074.4500	1929.23000	537.22500
	PIPE/FITTINGS, STEEL/IRON	CT	0.39595	12.23219	0.39595					0.00000	0.01967	12	0.26000	19.08000	0.26000
	PRESS. REDUCING VALVE, 2"	CT	0.62931	207.26763	0.42929					0.00000	0.01967	12	0.62490	323.30000	0.31200
	FUEL OIL SYSTEM														
	STORAGE SYSTEMS														
	OIL STORAGE TANK, 275 GAL.	CT	0.47892	30.26406	0.23946					0.00000	0.00000	25	2.60000	164.30000	1.30000
	OIL FILTER	CT	1.21193	39.52765	1.21193					3.39188	0.10400	30	0.45000	10.60000	0.45000
LPG SYSTEM	FUEL LEVEL METER	CT	0.72663	160.23364	0.72663					0.00000	0.03353	20	1.30000	620.10000	1.30000
	DISTRIBUTION SYSTEM	TF	15.32196	272.30623	7.74040					0.30864	0.08903	21	55.51000	1113.00000	27.75500
	PIPE/FITTINGS, COPPER														
	STORAGE SYSTEM														
	LPG STORAGE TANK, 1000 GAL	CT	0.95784	209.94922	0.47892					0.00000	0.00000	25	5.20000	1574.10000	2.60000
	DISTRIBUTION SYSTEM	TF	0.23781	14.79118	4.11890					1.26924	0.35344	62	1074.4500	1929.20000	537.22500
	PIPE/FITTINGS, STEEL/IRON														
	STEAM CENTRAL														
	PRESS. RED./REG. SYSTEM	CT	16.24752	170.06904	15.52239					1.20666	1.26976	23	7.35800	832.10000	3.67900
	STEAM CONVERTOR, <300,000	CT	16.13104	105.90505	14.05047					0.98213	1.02688	12	6.50000	147.34000	3.25000
SOLAR	FLASH TANK, 24 GAL.	CT	10.24506	521.70091	8.12253					0.00000	0.00000	5	7.80000	250.53100	3.90000
	STEAM REG. VALVE 2"	CT	8.13163	445.69025	8.13163					22.32794	0.68750	25	0.65000	1007.00000	0.65000
	COMP. METER, <300 #/HR.														
	VALVES	CT	0.00000	0.00000	0.00000					0.00000	0.00000	39	1.43000	20.22480	0.71500
	RADIATOR VALVE 1"														
	EQUIPMENT														
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000					0.00000	0.00000	39	5.20000	175.94000	2.60000
	RADIATOR RADIATION 10 FT	CT	1.76124	73.62582	0.88062					0.00000	0.00000	15	5.20000	232.14000	2.60000
	FINNED RADIATOR, WALL 10 F	CT	1.76124	68.65795	0.88062					0.00000	0.00000	15	5.20000	262.35000	2.60000
	SOLAR EQUIPMENT														
HEATING GENERATION	SOLAR PANEL, 3' X 8'	CT	2.33688	209.60016	1.16844					0.00000	0.00000	12	3.90000	349.80000	1.96000
	SOLAR STORAGE TANK, 1000GAL	CT	4.93896	694.60372	2.46948					0.00000	0.00000	17	15.60000	2194.20000	7.80000
	PIPING SYSTEM	TF	0.27591	1.43692	0.23194					0.12330	0.01990	34	41.70530	669.12500	20.85265
	PIPE/FITTINGS, PVC														
	EQUIPMENT														
	BOILER GAS 250 KBTU/HR	CT	456.53057	1161.94360	450.12482					46.10205	38.07571	23	65.00000	3169.40000	32.50000
	BOILER GAS 2000 KBTU/HR	CT	532.61523	4001.12562	505.32673					89.08295	42.58174	23	184.60000	15032.92000	46.15000
	BOILER GAS 10,000 KBTU/HR	CT	560.55994	13634.55100	523.79734					526.29359	43.89572	23	248.69000	38160.00000	62.17250
	BOILER COAL 40,000 KBTU/HR	CT	5646.7376	175618.68000	1709.2264					0.00000	68.67816	15	20880.000	4160.00000	46.15000
	REPAIR BOILER														
EQUIPMENT	BOILER COAL 100,000 KBTU/H	CT	10078.379	407129.64420	2672.8414					0.00000	79.09360	23	41690.4000	1590000.00000	262.60000
	REPAIR BOILER														
	BOILER OIL 250 KBTU/HR	CT	526.19059	999.31974	516.50106					32.14723	44.05326	15	1313.7800	3169.40000	32.45000
	BOILER OIL 2000 KBTU/HR	CT	599.53321	3337.61923	572.26471					32.14723	44.05326	23	65.00000	16.25000	16.25000
	BOILER OIL 10,000 KBTU/HR	CT	648.73048	7039.15727	631.09568					35.85311	53.18028	23	184.60000	15032.92000	46.17250
	BOILER GAS/OIL 2000 KBTU/HR	CT	551.52382	4326.87919	524.23532					35.85311	53.18028	23	184.60000	15032.92000	46.17250
	BOILER GAS/OIL 20000 KBTU	CT	666.50643	25586.29549	570.22800					994.39259	46.17759	23	651.30000	71020.00000	162.82500
	BOILER GAS/OIL 20000 KBTU	CT	2361.0933	5700.90879	2266.2039					110.58159	185.14779	9	364.00000	11236.00000	91.00000
	BOILER PHENAMT COAL SPREAD.	CT	1782.0473	73205.00066	4536.4398					120.25989	313.70734	15	10400.000	212000.00000	2600.00000
	ASH HANDLING SYSTEM	CT	11.24975	198.13043	5.42487					0.30221	0.41116	12	3.25000	389.02000	1.30000
EQUIPMENT	FUEL OIL EQUIPMENT	CT	9.24144	249.10072	8.19965					0.00000	0.61422	12	3.25000	389.02000	1.30000
	CHEMICAL FEED SYSTEM	CT	233.07141	1766.87160	220.84777					0.00000	0.61422	12	3.25000	389.02000	1.30000
	FEED-WATER SUPPLY	CT	109.20117	7180.44000	132.50508					0.00000	18.42658	12	28.60000	2756.00000	9.53333
	GENERATOR	CT	309.20117	7180.44000	132.50508					0.00000	9.48002	15	28.60000	21200.00000	65.00000

See NOTES on the last page of this Table for Explanation of Column Headings

See NOTES on the last page of this table for explanation of column headings

COMPONENT DESCRIPTION	Zone: 8	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (COST %)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				
		By Resources					Annual Maintenance and Repair				
		labor	material	equipment	D.C. Total	Washington	labor	material	equipment	yr	labo.
ELCLOFF SYSTEM	CT	1.66586	94.45097	0.83363	129.60		0.00000	0.00000	0.00000	12	2.60000
HOUSE FURN GAS 25KBTU/HR	CT	53.84305	490.72769	50.50933	1700.94		4.04816	22.53038	4.04816	12	10.40000
HOUSE FURN GAS 100KBTU/HR	CT	60.55730	616.83774	53.84305	1968.70		4.05191	26.98401	4.05191	12	20.80000
HOUSE FURN GAS 200KBTU/HR	CT	60.55730	1528.12303	53.84305	2680.16		4.05191	32.02918	4.05191	12	20.80000
HOUSE FURN OIL 25KBTU/HR	CT	68.20249	916.90808	64.86877	2433.07		3.28035	34.93397	3.28035	12	20.80000
HOUSE FURN OIL 100KBTU/HR	CT	74.86992	1278.03835	68.20249	2954.75		3.28035	40.89645	3.28035	12	20.80000
HOUSE FURN OIL 200KBTU/HR	CT	74.86992	1499.33767	68.20249	3176.05		3.28035	40.89645	3.28035	12	20.80000
HOUSE FURN ELECT 25KBTU/HR	CT	51.74635	563.47872	28.41263	1272.87		2.15203	15.22839	2.15203	12	10.40000
HOUSE FURN ELECT 100KBTU	CT	58.41379	738.19971	31.74635	1588.09		2.15203	22.01528	2.15203	12	10.40000
HOUSE FURN ELECT 200KBTU/H	CT	58.41379	941.21428	31.74635	1791.10		2.15203	22.01528	2.15203	12	10.40000
CASE IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	39	5.20000
BASEBOARD RADIATOR 10 FT	CT	1.76124	78.62582	0.89062	115.75		0.00000	0.00000	0.00000	15	5.20000
FINNED RADIATOR, WALL 10 F	CT	0.10074	88.85795	0.89062	125.98		0.00000	0.00000	0.00000	15	5.20000
EXPANSION TANK	CT	0.10074	0.00000	0.10074	2.28		0.00000	0.00000	0.00000	39	3.47100
STEAM CONVERTOR, <300,000	CT	16.11848	178.06904	15.39355	541.32		1.25870	1.25870	1.25870	23	7.35800
FLASH TANK, 24 GAL.	CT	16.11848	105.90505	14.05047	461.16		1.25870	1.25870	1.25870	23	7.35800
STORAGE TANK, 24 DIH	CT	26.92462	356.38757	48.92462	680.48		2.13879	3.03662	2.13879	42	6.50000
IND. FURN. GAS/OIL 500 MBU	CT	67.73611	2186.13817	48.02096	3659.30		4.78505	80.36361	3.86385	25	65.00000
IND. FURN. GAS/OIL 2000 MBU	CT	120.68677	4435.35687	95.18428	7140.92		7.43834	167.07978	7.43834	25	184.60200
SURGE TANK, 1000 GAL	CT	3.11584	943.20072	1.55792	1008.83		0.00000	0.00000	0.00000	12	5.20000
DIST. PIPING SYSTEM	TF	0.20836	0.10873	0.20836	4.83		0.01788	0.00933	0.01788	39	10.74450
PIPE/FITTINGS, ST. & C.I.	TF	1.26406	10.13159	0.17101	37.05		0.01458	0.00670	0.01458	21	5.55100
PIPE AND FITTINGS, COPPER	TF	60.74577	1951.96168	31.54842	3236.24		0.20175	0.99170	0.20175	21	24.18000
PIPE INSULATION	CT	17.51594	180.35985	17.51594	577.62		0.04648	0.39756	0.04648	25	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	1.26598	6.41333	1.26598	35.13		0.10103	0.02976	0.10103	15	0.26000
GATE VALVE, 2" - 3"	CT	0.47024	32.54973	0.47024	43.21		0.02373	0.05953	0.02373	15	0.57200
DRAIN VALVE	CT	1.80119	14.75620	1.80119	55.61		0.13454	0.74558	0.13454	15	0.48900
RADIATOR VALVE 1"	CT	0.21677	12.96432	0.21677	32.29		0.00000	0.00000	0.00000	12	1.43000
PRESSURE REDUCER VALVE 2"	CT	0.16206	521.78091	0.16206	864.23		0.00000	0.00000	0.00000	5	7.80000
STEAM TRAP F & T, <1"	CT	10.59560	155.25151	10.59560	395.56		0.06489	0.06064	0.06489	25	2.60000
PIPE INSULATION	TF	18.74257	192.99055	18.74257	618.07		0.06920	0.67338	0.06920	25	91.00000
CIRCULATION PUMP, < 1 HP	CT	5.06591	243.76496	5.06591	358.66		0.20371	0.50773	0.20371	12	4.19900
CIRCULATION PUMP, 5 HP	CT	5.06591	586.07476	5.06591	596.66		0.20371	6.05783	0.20371	12	4.19900
COND. REC. 10 - 15 GAL.	CT	30.09101	786.12471	27.44915	1460.13		2.12872	12.00360	2.12872	15	15.60000
COOLING GENERATION EQUIPMENT	CT	42.41765	0.00000	42.41765	962.14		3.43988	0.00000	3.43988	93	8.38500
A/C DX PACKAGE 5T	CT	107.55904	0.00000	107.55904	2439.44		9.22968	0.00000	9.22968	93	20.41000
A/C DX PACKAGE 30T	CT	137.85736	0.00000	137.85736	3126.60		11.82959	0.00000	11.82959	93	47.71000
A/C WINDOW 3T	CT	16.69391	0.00000	16.69391	446.66		1.68994	0.00000	1.68994	46	5.98000
A/C WINDOW 2T	CT	17.69391	0.00000	17.69391	446.66		1.68994	0.00000	1.68994	46	5.98000
A/C PAD MTD. 4T	CT	11.34579	2692.68516	106.73712	1305.62		4.93983	0.00000	4.93983	46	6.50000
CHILLER-AIR COOL RECIP. 20T	CT	262.08017	0.00000	131.04023	5203.24		8.96142	0.00000	8.96142	15	20.41000
CHILLER-AIR COOL REC. 50T	CT	325.70694	0.00000	162.85347	524.66		27.94904	0.00000	27.94904	93	47.71000
CHILLER-AIR COOL REC. 100T	CT	140.77719	0.00000	140.88719	6865.90		12.08959	0.00000	12.08959	93	28.60000
CHILLER-AIR COOL REC. 15T	CT	204.51366	0.00000	102.5683	3195.32		12.08959	0.00000	12.08959	93	28.60000
CHILLER-AIR COOL REC. 10T	CT	265.11030	0.00000	132.55515	4311.15		22.74922	0.00000	22.74922	93	28.60000
CHILLER-WAT. COOL REC. 20T	CT	265.11030	0.00000	132.55515	5888.53		22.74922	0.00000	22.74922	93	28.60000
CHILLER-WAT. COOL REC. 50T	CT	265.11030	0.00000	132.55515	5888.53		22.74922	0.00000	22.74922	93	28.60000
CHILLER-WAT. COOL REC. 100T	CT	234.81198	0.00000	117.40599	4949.64		20.17931	0.00000	20.17931	93	28.60000
CHILLER-WAT. COOL REC. 200T	CT	366.30358	0.00000	193.15179	5588.53		33.14886	0.00000	33.14886	93	28.60000
CHILL. HERMETIC CENT. 100T	CT	366.30358	0.00000	193.15179	8143.28		16.57443	0.00000	16.57443	93	62.40000
CHILL. HERMETIC CENT. 300T	CT	366.30358	0.00000	193.15179	8143.28		16.57443	0.00000	16.57443	93	62.40000
CHILL. HERMETIC CENT. 900T	CT	366.30358	0.00000	193.15179	8143.28		16.57443	0.00000	16.57443	93	62.40000

See NOTES on the last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 5

COMPONENT DESCRIPTION	Zone: 8	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (Ct 7x)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr
CHILL. OPEN CENT. 300T	CT	1007.4191	0.0000	503.70957	21236.40	65.44703	0.00000	43.22352	93
CHILL. OPEN CENT. 900T	CT	366.30358	0.0000	193.15179	8143.28	33.14846	0.00000	16.57443	93
CHILL. DBL. BOWL. MEM. 100T	CT	446.90022	0.0000	223.45011	9420.66	38.34868	0.00000	19.17434	93
CHILL. DBL. BOWL. MEM. 300T	CT	446.90022	0.0000	223.45011	9420.66	38.34868	0.00000	19.17434	93
CHILL. DBL. BOWL. MEM. 900T	CT	1325.5513	0.0000	662.77375	27942.83	113.74610	0.00000	56.87905	93
CHILL. ONE STG. ABS. 100T	CT	195.42416	0.0000	97.71208	4119.54	16.76942	0.00000	8.35171	93
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.0000	97.71208	4119.54	16.76942	0.00000	8.35171	93
CHILL. ONE STG. ABS. 900T	CT	181.78992	0.0000	90.69496	3032.13	15.59946	0.00000	7.79973	93
CHILL. TWO STG. ABS. 300T	CT	27.26849	0.0000	27.26849	618.45	2.33992	0.00000	2.33992	93
AIR COOLED CONDENSER 5T	CT	27.26849	0.0000	27.26849	574.82	2.33992	0.00000	2.33992	93
AIR COOLED CONDENSER 20T	CT	48.47731	0.0000	24.23866	1021.90	4.13908	0.00000	2.07993	93
AIR COOLED CONDENSER 50T	CT	48.47731	0.0000	24.23866	1021.90	4.13908	0.00000	2.07993	93
AIR COOLED CONDENSER 100T	CT	53.02206	0.0000	26.51103	1117.71	4.54984	0.00000	2.27492	93
COOLING TOWER 50T	CT	165.12547	0.0000	82.56292	3480.85	16.50943	0.00000	7.05472	93
COOLING TOWER 100T	CT	192.39433	0.0000	96.19171	4055.67	17.93935	0.00000	8.96049	93
COOLING TOWER 300T	CT	209.05041	0.0000	104.52920	4406.95	17.93935	0.00000	8.96049	93
EVAPORATIVE CONDENSER 20T	CT	159.04618	0.0000	79.53509	3333.12	13.64953	0.00000	6.82477	93
EVAPORATIVE CONDENSER 100T	CT	36.33798	0.0000	18.17699	766.43	3.11959	0.00000	1.55995	93
EXPANSION TANK	CT	0.10074	0.0000	0.10074	2.28	0.00824	0.00000	0.00824	93
REFRIG. FAN COIL 1T	CT	7.57458	0.0000	7.57458	171.79	0.64998	0.00000	0.64998	93
REFRIG. FAN COIL 5T	CT	7.57458	0.0000	7.57458	171.79	0.64998	0.00000	0.64998	93
REFRIG. FAN COIL 10T	CT	7.57458	0.0000	7.57458	171.79	0.64998	0.00000	0.64998	93
PIPE/FITTINGS ST. & C.I.	TF	2.41697	8.30426	1.35810	59.73	0.02568	0.01340	0.02568	23
PIPE/FITTINGS COPPER	TF	2.02395	17.34221	1.08368	60.24	0.01234	0.03567	0.01234	23
PIPE AND FITTINGS, PVC	TF	1.63304	8.03100	1.63304	45.07	0.06914	0.14013	0.06914	23
GATE VALVE, 3/8" - 1 1/2"	CT	0.50885	6.41433	0.50885	17.96	0.02364	0.02364	0.02364	13
GATE VALVE, 2" - 3"	CT	0.47024	32.54973	0.47024	43.21	0.02373	0.05953	0.02373	13
DRAIN VALVE	CT	1.80119	18.74257	1.80119	55.61	0.13454	0.74558	0.13454	13
PIPE INSULATION	TF	18.74257	182.20134	18.74257	607.37	0.04920	0.40367	0.04920	23
CIRCULATOR PUMP < 1 HP	CT	5.03309	263.76406	5.03309	357.92	0.20089	0.50773	0.20089	13
5 TON CHILLER ACH RECIP	CT	12.37510	886.07476	7.37452	1150.74	0.20371	6.05783	0.20371	13
HEAT/COOL GENERATION EQUIPMENT	CT	93.27357	269.04253	54.80891	4681.40	7.01494	67.81084	4.45595	17
MULTI-ZONE 6500 CFM	CT	95.33147	3515.49855	55.32339	5549.59	7.01494	67.81084	4.45595	17
MULTI-ZONE 10,000 CFM	CT	110.04224	6618.89962	62.20159	8961.57	7.33732	150.69280	4.82543	17
MULTI-ZONE 25,000 CFM	CT	123.92986	10438.01690	68.99845	13272.94	7.71975	171.02560	5.20483	17
MULTI-ZONE 50,000 CFM	CT	83.32038	620.09008	53.02206	2412.84	7.11975	53.21017	4.54984	17
DUAL DUCT 6500 CFM	CT	91.79981	2869.04253	54.07203	4850.33	6.88848	67.81084	4.39272	17
DUAL DUCT 10,000 CFM	CT	93.85771	3516.45989	54.58651	5519.48	6.88848	83.03085	4.39272	17
DUAL DUCT 25,000 CFM	CT	108.56849	6595.82743	61.66472	8907.43	7.26787	148.71296	4.76220	17
DUAL DUCT 50,000 CFM	CT	122.45610	10638.01690	68.25257	13241.87	7.64776	171.02560	5.14159	17
3 DK MULTI ZONE 6500 CFM	CT	92.03883	2699.03312	54.50023	4656.35	7.01494	67.81084	4.45595	17
3 DK MULTI ZONE 10,000 CFM	CT	95.33147	3515.49855	55.32339	5550.55	7.01494	67.81084	4.45595	17
3 DK MULTI ZONE 25,000 CFM	CT	110.04224	6618.89962	62.20159	8961.57	7.33732	150.69280	4.82543	17
3 DK MULTI ZONE 50,000 CFM	CT	123.92986	10438.01690	68.99845	13272.94	7.71975	171.02560	5.20483	17
D.D. VARI. VOL. 6500 CFM	CT	95.09245	2870.93533	53.22464	4813.55	6.88848	83.03085	4.44424	17
D.D. VARI. VOL. 10000 CFM	CT	95.09245	3786.61467	53.84201	5779.31	6.88848	83.03085	4.44424	17
D.D. VARI. VOL. 25000 CFM	CT	111.03797	7098.98173	68.93370	9418.59	7.26787	148.71296	4.76220	17
D.D. VARI. VOL. 50000 CFM	CT	125.74874	11362.62425	58.71672	13984.10	7.79575	168.69776	5.15706	17
D.D. VARI. VOL. 100,000 CFM	CT	90.89496	3355.89286	45.44748	5211.96	6.88848	83.03085	4.44424	17
VARIABLE VOLUME 6500 CFM	CT	90.89496	3355.89286	45.44748	5211.96	6.88848	83.03085	4.44424	17
VARIABLE VOLUME 10000 CFM	CT	93.85771	3516.45989	54.58651	5519.48	6.88848	83.03085	4.44424	17
VARIABLE VOLUME 25000 CFM	CT	90.88339	5965.18598	43.89506	7876.06	5.75030	94.59731	3.25454	17

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 54

COMPONENT DESCRIPTION	Zone: 8	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources				Annual Maintenance and Repair						
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
VARIABLE VOLUME 5000 CFM	CT	122.45610	10638.01690	58.36801	13242.24	7.64726	171.02560	5.15150	17	105.30000	27305.60000	26.32500
TERN. REHEAT 6500 CFM	CT	98.27366	334.19531	55.04598	5432.67	6.76183	66.74699	4.30575	17	32.50000	4279.22000	8.12500
TERN. REHEAT 10000 CFM	CT	101.38950	4654.99661	55.82494	6808.70	6.76183	81.58759	4.30575	12	37.70000	6181.92000	9.42500
TERN. REHEAT 25000 CFM	CT	125.95332	10840.22368	55.19924	13522.44	7.13176	146.35698	4.67568	12	71.50000	15274.60000	17.87500
TERN. REHEAT 50000 CFM	CT	155.19130	15672.94157	75.74198	18938.45	7.50170	169.82456	5.04562	12	113.00000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	98.27366	334.19531	55.04598	5432.67	6.76183	66.74699	4.30575	12	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	101.38950	4654.99661	55.82494	6808.70	6.76183	81.58759	4.30575	12	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	125.95332	10840.22368	55.19924	13522.44	7.13176	146.35698	4.67568	12	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	155.19130	15672.94157	75.74198	18938.45	7.50170	169.82456	5.04562	12	113.00000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	83.49546	826.73669	52.26640	2623.74	7.16939	70.89309	4.55962	70	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.01976	150.79042	4.48485	70	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 25000 CFM	CT	100.80496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	70	113.00000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 1000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 1400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 1600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 1800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 2000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 2200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 2400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 2600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 2800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 3000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 3200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 3400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 3600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 3800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 4000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 4200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 4400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 4600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 4800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 5000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 5200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 5400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 5600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 5800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 6000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 6200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 6400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 6600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 6800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 7000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 7200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 7400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 7600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 7800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 8000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 8200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 8400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 8600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 8800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 9000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 9200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 9400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 9600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 9800 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 10000 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 10200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 10400 CFM	CT	12.11933	74.11435	12.11933	348.98							

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE 5
COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C-7%)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					Replacement and High Costs Tests		
		By Resources					Annual Maintenance and Repair					Equipment		
		Washington					Labor					Material		
		Labor	Material	Equipment	D.C. Total	Washington	Labor	Material	Equipment	Yr	Labor	Material	Equipment	
Zone: 8														
DEVICES														
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37666	15.01479	308.92		1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000	
HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58		1.29996	0.00000	1.29996	46	0.78000	100.26540	0.78000	
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58		1.29996	0.00000	1.29996	70	0.78000	100.04280	0.78000	
RADIATION SENSOR	CT	15.03949	16.26355	15.03949	357.36		1.27643	0.00000	1.27643	23	0.78000	77.11500	0.78000	
WIND VELOCITY SENSOR	CT	14.80861	29.81543	14.80861	365.87		1.22690	0.00000	1.22690	11	0.78000	45.52700	0.78000	
PRESSURE SENSOR	CT	15.03949	12.79547	15.03949	353.39		1.27643	0.00000	1.27643	23	0.78000	58.30000	0.78000	
DAMPEN CONTROLLER/ELECT.	CT	15.56074	90.92974	15.56074	443.85		1.26464	0.00000	1.26464	17	2.60000	287.20700	2.60000	
SIMPLEX AIR COMP. 1 HP	CT	44.94540	44.71341	31.03197	1019.55		3.85678	3.83691	2.66287	28	3.67900	6103.82980	1.83951	

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)																						PAGE	50
COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS										Replacement and High Costs Tasks							
		By Resources				Washington		Annual Maintenance and Repair		Equipment		Labor		Material									
		um	labor	material	equipment	D.C. Total	Labor	material	equipment	yr	Labor	material	equipment										
Zone: 9																							
HVAC																							
NATURAL GAS SYSTEM																							
EQUIPMENT																							
GAS METER		CT	0.13209	33.38905	0.13209	36.38								0.00000	0.00000	0.00000	16	0.39000	98.58060	0.39000			
PIPING SYSTEM																							
PIPE/FITTINGS, STEEL/IRON		TF	8.49634	15.17379	4.28020	194.38								0.72907	1.30207	0.36729	58	1074.4500	1929.20000	537.22500			
PRESS. REDUCING VALVE, 2"		CT	0.41640	13.37126	0.41640	22.82								0.02010	0.00000	0.02010	11	0.26000	19.08000	0.26000			
PRESS. REDUCING VALVE, 2"		CT	0.67149	226.56864	0.45284	241.10								0.02010	0.00000	0.02010	11	0.62400	323.30000	0.51200			
FUEL OIL SYSTEM																							
STORAGE SYSTEMS																							
OIL STORAGE TANK, 275 GAL.		CT	0.51246	32.38353	0.25623	43.19								0.00000	0.00000	0.00000	23	2.60000	164.30000	1.30000			
OIL FILTER		CT	1.21193	39.52765	1.21193	67.01								0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000			
FUEL LEVEL METER		CT	0.72643	160.23384	0.72643	176.71								0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000			
DISTRIBUTION SYSTEM																							
PIPE/FITTINGS, COPPER		TF	16.39387	291.44701	8.28192	637.30								0.17592	0.33018	0.09525	19	55.51000	1113.00000	27.75500			
LPG SYSTEM																							
STORAGE SYSTEM																							
LPG STORAGE TANK, 1000 GAL		CT	1.02492	310.25511	0.51246	331.86								0.00000	0.00000	0.00000	23	5.20000	1574.10000	2.60000			
DISTRIBUTION SYSTEM		TF	8.43228	15.14036	4.21614	192.89								0.72358	1.29920	0.36179	58	1074.4500	1929.20000	537.22500			
PIPE/FITTINGS,STEEL/IRON																							
STEAM, CENTRAL																							
PRESS. RED./REG. SYSTEM		CT	18.81785	217.15562	17.92937	641.10								1.46229	1.39041	1.46229	20	7.35800	832.10000	3.67900			
STEAM CONVERTOR, <300,000		CT	18.32157	118.11537	15.99263	526.80								1.17248	1.12682	1.17248	10	6.50000	147.34000	3.25000			
FLASH TANK, 24 GAL.		CT	19.83076	604.83194	9.41538	1001.78								0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000			
STEAM REG. VALVE 2"		CT	7.94034	476.86326	7.94034	656.95								0.67037	23.88820	0.67037	23	0.65000	1007.00000	0.65000			
COMP. METER, <300 #/HR.																							
VALVES		CT	0.00000	0.00000	0.00000	0.00								0.00000	0.00000	0.00000	34	1.43000	20.22480	0.71500			
RADIATOR VALVE 1"		CT	0.00000	0.00000	0.00000	0.00								0.00000	0.00000	0.00000	34	5.20000	175.96000	2.60000			
EQUIPMENT		CT	2.01656	90.02389	1.00828	132.53								0.00000	0.00000	0.00000	14	5.20000	232.14000	2.60000			
CAST IRON RADIATOR 10 SECT		CT	2.01656	101.73933	1.00828	144.25								0.00000	0.00000	0.00000	14	5.20000	262.35000	2.60000			
BASEBOARD RADIATION 10 FT		CT																					
FINNED RADIATOR, WALL 10 F		TF	0.26620	1.34367	0.22510	7.25								0.02284	0.11530	0.01932	36	41.70530	669.12500	20.85265			
SOLAR																							
EQUIPMENT																							
SOLAR PANEL, 3' X 8'		CT	458.95591	1353.20910	451.10716	11737.21								38.03618	50.43926	38.03618	20	65.00000	3169.40000	32.50000			
SOLAR STORAGE TANK, 1000GAL		CT	540.66640	4766.25367	507.23072	16921.57								42.56929	97.46374	42.56929	20	184.60000	15032.92000	46.15000			
PIPE/FITTINGS, PVC		CT	571.35281	15925.85878	526.30883	28740.00								43.87435	575.80651	43.87435	20	248.69000	38160.00000	62.17250			
HEATING GENERATION		CT	6617.1947	211143.52000	1903.7016	346138.32								68.41023	0.00000	68.41023	20	20800.000	435000.00000	4160.0000			
EQUIPMENT																							
BOILER GAS 250 KBTU/HR		CT	458.95591	1353.20910	451.10716	11737.21								38.03618	50.43926	38.03618	20	65.00000	3169.40000	32.50000			
BOILER GAS 2000 KBTU/HR		CT	540.66640	4766.25367	507.23072	16921.57								42.56929	97.46374	42.56929	20	184.60000	15032.92000	46.15000			
BOILER GAS 10,000 KBTU/HR		CT	571.35281	15925.85878	526.30883	28740.00								43.87435	575.80651	43.87435	20	248.69000	38160.00000	62.17250			
BOILER COAL 40,000 KBTU/HR		CT	6617.1947	211143.52000	1903.7016	346138.32								68.41023	0.00000	68.41023	20	20800.000	435000.00000	4160.0000			
REPAIR BOILER																							
BOILER COAL 100,000 KBTU/H		CT	11984.347	491314.85480	3054.7833	734545.25								122.57702	0.00000	122.57702	14	1050.4000	148400.00000	262.60000			
REPAIR BOILER																							
BOILER OIL 250 KBTU/HR		CT	559.81076	1175.28582	518.03764	13153.72								44.11626	35.17160	44.11626	20	65.00000	3169.40000	16.25000			
BOILER OIL 2000 KBTU/HR		CT	404.72703	4040.32590	573.29136	17693.90								48.23798	35.17160	48.23798	20	184.60000	15032.92000	46.15000			
BOILER OIL 10,000 KBTU/HR		CT	578.57852	9472.76927	633.53459	27918.79								53.07544	60.38536	53.07544	20	248.69000	38160.00000	62.17250			
BOILER GAS/OIL 2000 KBTU/H		CT	559.16095	5217.32356	523.72532	17792.10								44.15632	60.38536	44.15632	20	184.60000	18689.92000	46.15000			
BOILER GAS/OIL 20000 KBTU		CT	694.84028	29529.78920	576.87136	45211.27								46.12745	1087.94337	46.12745	20	451.30000	71020.00000	162.82500			
BOILER. PNEUMAT. COAL SPREAD.		CT	2361.7018	7692.17195	2208.1814	60764.85								182.20102	156.48339	182.20102	28	564.00000	11236.00000	91.00000			
ASH HANDLING SYSTEM		CT	767.7414	83768.14024	4648.7446	248206.53								312.74640	133.59571	312.74640	14	10400.000	21200.00000	2600.0000			
FUEL OIL EQUIPMENT		CT	11.76565	221.35344	3.88282	469.37								0.84974	0.41777	0.84974	10	2.60000	302.10000	1.30000			
CHEMICAL FEED SYSTEM		CT	9.43774	278.77173	8.27327	489.09								0.91001	0.00000	0.91001	10	3.25000	389.02000	1.62500			
FEED-WATER SUPPLY		CT	233.75846	1974.94960	220.09529	7232.87								18.30024	0.00000	18.30024	10	28.60000	2756.00000	9.53333			
DEAERATOR		CT	321.03503	8221.36000	135.32552	14908.75								18.89863	0.00000	18.89863	14	260.00000	21200.00000	65.00000			

See NOTES on the last page of this table for Explanation of Column Headings

Zone: 9	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/hr)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		Labor	Material	Equipment	Washington D.C. Total	Labor	Material	Equipment	Replacement and High Costs Tasks
CT	BLOWOFF SYSTEM	1.86316	105.58384	0.93158	144.86	0.00000	0.00000	0.00000	1.30000
CT	HOUSE FURN. GAS 25KBTU/HR	54.59424	54.17108	50.85792	1797.76	4.04438	24.64871	4.04438	5.20000
CT	HOUSE FURN. GAS 100KBTU/HR	62.08465	63.17497	54.63201	2065.97	4.04848	29.49490	4.04848	10.40000
CT	HOUSE FURN. GAS 250KBTU/HR	62.08465	1098.61714	54.63201	3082.85	5.26850	35.92863	4.04848	10.40000
CT	HOUSE FURN. OIL 25KBTU/HR	68.86959	1015.66380	65.12327	2565.25	5.26850	35.92863	4.04848	10.40000
CT	HOUSE FURN. OIL 100KBTU/HR	76.30223	1664.48645	68.86959	3125.17	5.26850	38.18461	5.26850	10.40000
CT	HOUSE FURN. OIL 250KBTU/HR	76.30223	1664.48645	68.86959	3125.17	5.26850	38.18461	5.26850	10.40000
CT	HOUSE FURN. ELECT 25KBTU/HR	32.71980	625.43413	28.79348	1355.60	2.16819	16.71099	2.16819	5.20000
CT	HOUSE FURN. ELECT 100KBTU/HR	40.17244	318.79387	32.71980	1706.06	2.16819	16.71099	2.16819	5.20000
CT	HOUSE FURN. ELECT 200KBTU/HR	40.17244	1043.91132	32.71980	1931.17	2.16819	30.91533	2.16819	5.20000
CT	CAST IRON RADIATOR 10 FT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	10.40000
CT	BASEBOARD RADIATOR 10 FT	2.01656	90.02369	1.00828	132.53	0.00000	0.00000	0.00000	10.40000
CT	FURNED RADIATOR, WALL 10 F	2.01656	101.75933	1.00828	144.25	0.00000	0.00000	0.00000	10.40000
CT	EXPANSION TANK, <300,000	0.11714	0.00000	0.11714	2.66	0.00000	0.00000	0.00000	2.60000
CT	STEAM CONVERTER, <300,000	18.61938	217.15542	17.73090	636.60	1.44525	1.39041	0.01005	2.60000
CT	FLASH TANK, 24 GAL.	18.32157	118.71337	15.99262	526.80	1.17248	1.12682	1.17248	3.67500
CT	STORAGE TANK, 24 GAL.	22.50517	37.73465	28.58056	640.59	2.28089	3.23837	2.28089	3.25000
CT	IND. FURN. GAS/OIL 500 MBTU	43.08357	2320.61831	48.39078	3018.29	4.81586	84.39357	3.87759	1.79598
CT	IND. FURN. GAS/OIL 2000 MBTU	122.70405	4740.75830	95.50756	7458.45	7.41500	175.55825	7.41500	16.25000
CT	SURGE TANK, 1000 GAL	3.33372	1009.15531	1.66886	1079.43	0.00000	0.00000	0.00000	2.60000
TF	PIPE/FITTINGS, ST. & C.I.	0.23290	0.12154	0.23290	5.40	0.01908	0.01908	0.01908	5.37225
TF	PIPE/FITTINGS, COPPER	1.52710	12.40393	0.25882	47.89	0.01908	0.01908	0.01908	2.77550
TF	PIPE AND FITTINGS, PVC	64.98641	2088.55647	33.75365	3462.71	0.21584	1.04097	0.21584	8034.80000
CT	PIPE INSULATION	18.74257	192.99055	18.74257	618.07	0.04926	0.02338	0.04926	994.00000
CT	GATE VALVE, 3/8" - 1 1/2"	1.40741	37.33179	1.40741	39.25	0.11212	0.03301	0.11212	0.29000
CT	GATE VALVE, 2" - 3"	2.02853	37.24355	2.02853	49.23	0.02632	0.03041	0.02632	0.57200
CT	DRAIN VALVE	0.06483	17.78973	2.06483	64.62	0.13426	0.03041	0.13426	0.68900
CT	RADIATOR VALVE 1"	1.02474	14.49309	0.51237	36.09	0.00000	0.00000	0.00000	1.43000
CT	PRESSURE REDUCER VALVE 2"	18.83076	604.83194	9.41538	1001.78	0.00000	0.00000	0.00000	20.22480
CT	STEAM TRAP, F & T, <1"	10.20456	150.68681	10.20456	382.13	0.15885	4.79731	0.15885	3.90000
TF	PIPE INSULATION	22.90576	236.10295	22.90576	755.61	0.07974	0.49014	0.07974	151.41040
CT	CIRCULATION PUMP, <1 HP	5.54727	272.17923	5.54727	307.99	0.21781	0.54238	0.21781	954.00000
CT	CIRCULATION PUMP, 5 HP	5.54727	992.04314	5.54727	1113.04	0.21781	6.91013	0.21781	4.19900
CT	COND. RCVR, 10 - 15 GAL.	32.22698	899.70038	29.20514	1621.00	2.24654	13.71061	2.24654	1908.00300
CT	EQUIPMENT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	4.19250
CT	A/C BY PACKAGE 5T	137.55904	0.00000	137.55904	2439.44	11.82959	0.00000	11.82959	6.80333
CT	A/C BY PACKAGE 20T	137.55904	0.00000	137.55904	2439.44	11.82959	0.00000	11.82959	11.92750
CT	A/C BY PACKAGE 50T	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	5.98000
CT	A/C WINDOW 2T	57.56581	0.00000	57.56581	1305.62	4.93983	0.00000	4.93983	6.50000
CT	A/C WINDOW 4T	111.89464	0.00000	111.89464	2613.90	8.92253	0.00000	8.92253	3.25000
CT	A/C PAD MOUNTED 20 TON	262.08027	0.00000	262.08027	5524.66	22.94904	0.00000	22.94904	7.15000
CT	CHILLER AIR COOL RECIP. 20T	325.70894	0.00000	325.70894	6885.90	27.94904	0.00000	27.94904	10.07500
CT	CHILLER AIR COOL REC. 50T	325.70894	0.00000	325.70894	6885.90	27.94904	0.00000	27.94904	18.20000
CT	CHILLER AIR COOL RECIP. 5T	140.88719	0.00000	140.88719	3106.72	12.08950	0.00000	12.08950	5.20000
CT	CHILLER AIR COOL REC. 10T	265.11030	0.00000	265.11030	5588.23	22.74922	0.00000	22.74922	6.81333
CT	CHILLER AIR COOL REC. 15T	265.11030	0.00000	265.11030	5588.23	22.74922	0.00000	22.74922	7.15000
CT	CHILLER WATER COOL REC. 20T	265.11030	0.00000	265.11030	5588.23	22.74922	0.00000	22.74922	12.02500
CT	CHILLER WATER COOL REC. 50T	265.11030	0.00000	265.11030	5588.23	22.74922	0.00000	22.74922	18.52500
CT	CHILLER WATER COOL REC. 10T	234.81198	0.00000	234.81198	4949.84	20.74922	0.00000	20.74922	5.20000
CT	CHILLER WATER COOL REC. 20T	265.11030	0.00000	265.11030	5588.23	22.74922	0.00000	22.74922	18.52500
CT	CHILL. HERMETIC CENT. 100T	386.30358	0.00000	386.30358	8143.28	33.14886	0.00000	33.14886	24.37500
CT	CHILL. HERMETIC CENT. 300T	386.30358	0.00000	386.30358	8143.28	33.14886	0.00000	33.14886	40.62500
CT	CHILL. HERMETIC CENT. 900T	386.30358	0.00000	386.30358	8143.28	33.14886	0.00000	33.14886	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

Zone: 9	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/hr %)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
CT	CHILL. OPEN CENT. 300T	1007.4191	0.0000	503.70957	2135.40	86.44703	0.0000	43.2352	91	97.50000	61771.50000	26.37500	
CT	CHILL. OPEN CENT. 900T	366.30358	0.0000	193.15179	813.28	33.14884	0.0000	16.57425	91	162.50000	127500.00000	40.25000	
CT	CHILL.DBL.BMOL. HEMA. 300T	446.90022	0.0000	233.45011	9420.66	38.34848	0.0000	19.17434	91	168.90000	41340.00000	17.25000	
CT	CHILL.DBL.BMOL. HEMA. 900T	446.90022	0.0000	233.45011	9420.66	38.34848	0.0000	19.17434	91	107.90000	67840.00000	26.27500	
CT	CHILL. ONE STG. ABS. 300T	1325.5515	0.0000	662.77575	27942.63	113.74610	0.0000	56.87305	91	178.10000	139920.00000	44.52500	
CT	CHILL. ONE STG. ABS. 900T	195.42416	0.0000	97.71208	4119.34	16.76942	0.0000	8.38471	91	65.00000	37100.00000	15.25000	
CT	CHILL. TWO STG. ABS. 300T	195.42416	0.0000	97.71208	4119.34	16.76942	0.0000	8.38471	91	167.70000	113420.00000	26.00000	
CT	CHILL. TWO STG. ABS. 900T	181.78992	0.0000	90.89496	3832.13	15.59946	0.0000	7.79973	91	114.40000	67840.00000	28.60000	
CT	AIR COOLED CONDENSER 5T	27.26849	0.0000	27.26849	618.45	2.33992	0.0000	2.33992	68	9.10000	125822.00000	46.15000	
CT	AIR COOLED CONDENSER 20T	48.47731	0.0000	13.63424	574.82	4.15966	0.0000	1.16996	68	20.80000	2438.00000	6.93333	
CT	AIR COOLED CONDENSER 50T	48.47731	0.0000	24.23866	1021.90	4.15966	0.0000	2.07993	68	31.20000	5294.70000	7.60000	
CT	AIR COOLED CONDENSER 100T	53.02206	0.0000	26.51103	1117.71	4.54984	0.0000	2.27492	68	46.80000	10578.60000	11.70000	
CT	COOLING TOWER 50T	165.12584	0.0000	82.56292	3480.85	14.16951	0.0000	7.08476	68	52.00000	10070.00000	13.00000	
CT	COOLING TOWER 300T	192.39433	0.0000	96.19717	4055.67	16.50943	0.0000	8.25472	68	78.00000	16377.00000	19.50000	
CT	EVAPORATIVE CONDENSER 20T	209.05841	0.0000	104.52920	4406.95	17.93938	0.0000	8.96969	68	128.70000	43142.00000	32.17500	
CT	EVAPORATIVE CONDENSER 100T	66.95442	0.0000	48.47731	2043.80	8.31971	0.0000	4.15966	68	100.10000	3646.80000	9.10000	
CT	EXPANSION TANK	36.35798	0.0000	79.53309	353.12	3.11969	0.0000	0.00000	34	182.00000	31800.00000	45.50000	
CT	REFRIG. FAN COIL 1T	7.37458	0.0000	0.11714	766.43	0.01005	0.0000	0.00000	34	2.47100	135.68000	1.73550	
CT	REFRIG. FAN COIL 5T	7.37458	0.0000	7.57458	171.79	0.64998	0.0000	0.64998	68	2.40000	855.42000	1.30000	
CT	REFRIG. FAN COIL 5T	7.37458	0.0000	7.57458	171.79	0.64998	0.0000	0.64998	68	3.25000	1971.52000	1.23000	
CT	DIST. PIPING SYSTEM	2.92321	10.15499	1.62581	72.30	0.02818	0.01471	0.02818	20	10.74450	61.34000	5.37225	
TF	PIPE/FITTINGS ST. & C.I.	2.31221	19.85398	1.23587	68.55	0.01369	0.00629	0.01369	14	3.55100	51.00720	2.77530	
TF	PIPE AND FITTINGS, COPPER	7.62376	7.62376	1.54998	42.78	0.13300	0.05420	0.13300	30	24.18000	8321.00000	120.90000	
CT	GATE VALVE, 3/8" - 1 1/2"	0.57278	7.33179	0.57278	20.32	0.02622	0.03301	0.02622	14	0.68900	17.91400	0.68900	
CT	GATE VALVE, 2" - 3"	0.52853	37.24355	0.52853	49.23	0.02632	0.06603	0.02632	14	0.57200	94.05380	0.57200	
TF	DRAIN VALVE	2.06483	17.78973	2.06483	64.62	0.15426	0.93041	0.15426	14	0.68900	17.91400	0.68900	
TF	PIPE INSULATION	223.01202	223.01202	22.90576	742.51	0.07974	0.46514	0.07974	20	91.00000	901.00000	91.00000	
CT	CIRCULATOR PUMP, < 1 HP	272.17923	5.50962	5.50962	397.14	0.21458	0.54238	0.21458	10	4.19900	371.00000	4.19900	
CT	5 TON CHILLER ACH RECIP	992.04314	8.12775	8.12775	1285.26	0.21781	6.91013	0.21781	10	15.60000	1272.00000	7.80000	
CT	HEAT/COOL GENERATION												
CT	EQUIPMENT												
CT	MULTI-ZONE 6500 CFM	92.66009	2566.32005	54.71473	4546.58	7.02764	67.93315	4.46403	18	36.40000	5997.48000	9.10000	
CT	MULTI-ZONE 10,000 CFM	94.59144	3350.59652	55.19556	5329.86	7.02764	83.09830	4.46403	18	42.90000	8050.70000	10.72500	
CT	MULTI-ZONE 25,000 CFM	108.63756	6304.12370	61.91366	8618.51	7.40773	150.96427	4.83421	18	75.40000	15359.40000	18.85000	
CT	MULTI-ZONE 50,000 CFM	121.91430	10076.34427	68.55466	12670.61	7.78781	171.33051	5.21629	18	105.30000	27305.60000	26.32500	
CT	MULTI-ZONE 3500 CFM	91.19145	620.09008	53.02206	2412.84	6.90955	53.21017	4.54984	18	26.40000	4240.00000	6.10000	
CT	DUAL DUCT 6500 CFM	91.19145	2566.32005	53.97650	4515.46	6.90955	67.93315	4.40068	18	36.40000	5997.48000	9.10000	
CT	DUAL DUCT 10,000 CFM	91.19145	3351.55962	54.5734	5339.70	6.90955	83.18095	4.70068	18	42.90000	8050.70000	10.72500	
CT	DUAL DUCT 25,000 CFM	107.14109	6281.00933	61.17433	8564.27	7.28103	148.98082	4.60068	18	75.40000	15359.40000	18.85000	
CT	DUAL DUCT 50,000 CFM	120.57768	10876.34427	67.81433	12639.49	7.66112	171.33051	5.15095	18	105.30000	27305.60000	26.32500	
CT	3 DK.MULTI ZONE 6500 CFM	94.59144	3351.55962	55.19556	4546.58	7.02764	67.93315	4.46403	18	36.40000	5997.48000	9.10000	
CT	3 DK.MULTI ZONE 10,000 CFM	94.59144	3351.55962	55.19556	4546.58	7.02764	83.09830	4.46403	18	42.90000	8050.70000	10.72500	
CT	3 DK.MULTI ZONE 25,000 CFM	108.63756	6304.12370	61.91366	8618.51	7.40773	150.96427	4.83421	18	75.40000	15359.40000	18.85000	
CT	3 DK.MULTI ZONE 50,000 CFM	121.91430	10076.34427	68.55466	12670.61	7.78781	171.33051	5.21629	18	105.30000	27305.60000	26.32500	
CT	D.O. VARI.VOL. 6500 CFM	91.19145	2566.32005	53.02206	4515.46	6.90955	67.93315	4.40068	18	36.40000	5997.48000	9.10000	
CT	D.O. VARI.VOL. 10000 CFM	91.19145	3351.55962	54.5734	5339.70	6.90955	83.18095	4.70068	18	42.90000	8050.70000	10.72500	
CT	D.O. VARI.VOL. 25000 CFM	107.14109	6281.00933	61.17433	8564.27	7.28103	148.98082	4.60068	18	75.40000	15359.40000	18.85000	
CT	D.O. VARI.VOL. 50000 CFM	120.57768	10876.34427	67.81433	12639.49	7.66112	171.33051	5.15095	18	105.30000	27305.60000	26.32500	
CT	D.O. VARI.VOL. 100,000CFM	120.57768	10876.34427	67.81433	12639.49	7.66112	171.33051	5.15095	18	105.30000	27305.60000	26.32500	
CT	VARIABLE VOLUME 6500 CFM	91.19145	2566.32005	53.02206	4515.46	6.90955	67.93315	4.40068	18	36.40000	5997.48000	9.10000	
CT	VARIABLE VOLUME 10000 CFM	91.19145	3351.55962	54.5734	5339.70	6.90955	83.18095	4.70068	18	42.90000	8050.70000	10.72500	
CT	VARIABLE VOLUME 25000 CFM	107.14109	6281.00933	61.17433	8564.27	7.28103	148.98082	4.60068	18	75.40000	15359.40000	18.85000	
CT	VARIABLE VOLUME 50000 CFM	120.57768	10876.34427	67.81433	12639.49	7.66112	171.33051	5.15095	18	105.30000	27305.60000	26.32500	

See NOTES on the last page of this table for Explanation of Column Headings







EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 61
Zone: 10	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		um	labor	material	equipment	Washington D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC	NATURAL GAS SYSTEM												
	EQUIPMENT												
	GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
	PIPING SYSTEM	TF	9.07458	16.23970	4.58497	208.11	0.78058	1.39354	0.39344	54	1074.4500	1929.20000	537.22500
	PIPE/FITTINGS, STEEL/IRON	CT	0.36912	13.67273	0.36912	22.50	0.01740	0.00000	0.01740	10	0.25000	19.08000	0.26000
	PRESS. REDUCING VALVE, 2"	CT	0.04996	231.67678	0.42638	245.70	0.01740	0.00000	0.01740	10	0.62400	323.30000	0.31200
	FUEL OIL SYSTEM												
	STORAGE SYSTEMS												
	OIL STORAGE TANK, 275 GAL.	CT	0.58682	37.08251	0.29341	49.45	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000
	OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.65000	0.65000
LPG	FUEL LEVEL METER	CT	0.72663	160.23364	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
	DISTRIBUTION SYSTEM												
	PIPE/FITTINGS, COPPER	TF	18.61143	333.45030	9.39288	726.06	0.18758	0.35299	0.10127	18	55.51000	1113.00000	27.75500
	STORAGE SYSTEM												
	LPG STORAGE TANK, 1000 GAL	CT	1.17364	355.27437	0.50682	380.01	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000
	DISTRIBUTION SYSTEM												
	PIPE/FITTINGS, STEEL/IRON	TF	9.02323	16.20142	4.51162	206.41	0.77429	1.39025	0.38714	54	1074.4500	1929.20000	537.22500
	STEAM CENTRAL												
	PRESS. RED./REG. SYSTEM	CT	22.43493	265.49930	21.34031	770.89	1.73849	1.65450	1.73849	18	7.35800	832.10000	3.67900
	STEAM CONVERTER, <300,000	CT	22.08509	139.81152	19.35574	631.97	1.39053	1.37943	1.39053	9	13.00000	294.68000	6.50000
SOLAR	FLASH TANK, 24 GAL.	CT	20.93968	672.57552	10.46994	1113.99	0.60000	0.00000	0.00000	4	7.80000	250.53100	3.90000
	STEAM REG. VALVE 2"	CT	7.96239	525.16285	7.96239	706.20	0.67238	25.56145	0.67238	22	0.65000	1007.00000	0.65000
	COND. METER, <300 #/HR.												
	VALVES												
	RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500
	EQUIPMENT												
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
	BASEBOARD RADIATOR 10 FT	CT	3.33372	146.82495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
	FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
	SOLAR EQUIPMENT												
HEATING	SOLAR PANEL, 3' X 8'	CT	2.73312	245.13984	1.36656	302.75	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000
	SOLAR STORAGE TANK, 1000GAL	CT	5.65344	795.17808	2.82672	914.35	0.00000	0.00000	0.00000	14	15.60000	2194.20000	7.80000
	PIPE/FITTINGS, PVC	TF	0.11911	0.01100	0.11911	2.71	0.01022	0.00094	0.01022	38	41.70530	669.12500	20.85265
	EQUIPMENT												
	BOILER GAS 250 KBTU/HR	CT	462.23272	1639.63596	452.61597	12092.30	38.01394	60.22264	38.01394	18	65.00000	3169.40000	32.50000
	BOILER GAS 2000 KBTU/HR	CT	549.22885	5804.34884	508.26149	18129.76	42.44231	116.36814	42.44231	18	184.60000	15032.92000	46.15000
	BOILER GAS 10,000 KBTU/HR	CT	583.57086	19303.29970	528.38033	32362.08	43.76188	687.49191	43.76188	18	248.60000	38160.00000	62.17250
	BOILER COAL 40,000 KBTU/HR	CT	7802.0534	254082.00000	2140.9264	412916.97	101.33829	0.00000	68.08094	12	20800.00000	636000.00000	4160.00000
	REPAIR BOILER												
	BOILER COAL 100,000 KBTU/HR	CT	14314.375	593365.10400	3521.4362	883477.73	121.98952	0.00000	78.40655	12	1050.4000	159000.00000	8320.00000
FEED-WATER	REPAIR BOILER												
	BOILER OIL 250 KBTU/HR	CT	536.95058	1427.20208	522.52546	13559.08	44.42551	41.99360	44.42551	18	65.00000	3169.40000	16.25000
	BOILER OIL 2000 KBTU/HR	CT	616.71760	4937.61765	575.75024	18793.68	48.23355	41.99360	48.23355	18	184.60000	15032.92000	46.15000
	BOILER OIL 10,000 KBTU/HR	CT	691.78489	11837.33963	634.9636	27350.46	53.04792	46.83494	53.04792	18	248.60000	38160.00000	62.17250
	BOILER GAS/OIL 2000 KBTU/HR	CT	549.22885	5804.34884	508.26149	18129.76	42.44231	116.36814	42.44231	18	184.60000	15032.92000	46.15000
	BOILER GAS/OIL 20000 KBTU/HR	CT	731.05042	36152.43439	586.51067	19165.90	44.22035	72.99792	44.22035	18	184.60000	15032.92000	46.15000
	BOILER PNEUMAT. COAL SPREAD.	CT	2351.0872	8415.02376	2189.1576	52270.33	46.19437	1208.96482	46.19437	18	651.30000	71020.00000	162.82500
	ASH HANDLING SYSTEM	CT	10231.013	137644.02460	5225.8048	61612.31	180.23881	175.00206	179.19098	12	1050.4000	11236.00000	91.00000
	FUEL OIL EQUIPMENT	CT	13.42164	360.00032	8.10395	35346.71	305.79160	148.32719	305.79160	12	1040.0000	21200.00000	2600.00000
	CHEMICAL FEED SYSTEM	CT	9.73806	360.00032	8.10395	513.47	0.48270	0.25719	0.48270	9	5.20000	694.25000	3.25000
FEED-WATER SUPPLY	CT	234.87958	2314.58880	218.96739	7590.32	0.00000	0.00000	0.00000	9	5.20000	5512.00000	19.04667	
DEAERATOR	CT	382.04738	13591.32000	149.35219	21511.55	18.48024	0.00000	9.24012	12	260.00000	21200.00000	65.00000	

See NOTES on the last page of this table for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings

Zone: 10	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (Cm 7X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		labor	material	equipment	D.C. Total	labor	material	equipment	Replacement and High Costs Tasks
CT	BLOWOFF SYSTEM 25KBTU/HR	2.18348	123.73613	1.09174	169.76	0.00000	0.00000	0.00000	2.60000
CT	HOUSE FURN.GAS 100KBTU/HR	56.39138	681.52064	52.02442	1946.30	0.35006	32.69178	0.00000	10.40000
CT	HOUSE FURN.GAS 200KBTU/HR	65.18905	894.35050	56.43513	2305.34	0.35553	39.35864	0.35553	20.80000
CT	HOUSE FURN.OIL 25KBTU/HR	70.51255	1256.68642	66.14559	3509.23	0.35553	47.94395	0.35553	20.80000
CT	HOUSE FURN.OIL 100KBTU/HR	79.24647	1734.66698	70.51255	3804.03	0.35553	46.71748	0.35553	20.80000
CT	HOUSE FURN.OIL 200KBTU/HR	79.24647	2034.66698	70.51255	3804.03	0.35553	50.95439	0.35553	20.80000
CT	HOUSE FURN.ELECT.25KBTU/HR	35.07873	764.60620	30.71177	1546.22	0.35553	59.65120	0.35553	20.80000
CT	HOUSE FURN.ELECT.100KBTU/HR	43.81265	1005.13297	35.07873	1970.86	0.45125	72.29951	0.45125	20.80000
CT	HOUSE FURN.ELECT.200KBTU/HR	43.81265	1281.92796	35.07873	2247.65	0.45125	82.11130	0.45125	20.80000
CT	CASE IRON RADIATOR 10 SECT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	2.60000
CT	BASEBOARD RADIATOR 10 FT	3.33372	148.82495	1.66686	219.10	0.00000	0.00000	0.00000	2.60000
CT	FINISHED RADIATOR, WALL 10 F	3.33372	168.19259	1.66686	236.47	0.00000	0.00000	0.00000	2.60000
CT	EXPANSION TANK	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.01194	1.75550
CT	STEAM CONVERTOR, <300,000	22.09729	265.49930	21.00647	763.18	1.70935	1.65450	1.70935	3.67900
CT	FLASH TANK, 24 GAL.	22.04509	139.81152	19.35574	631.97	1.39053	1.37943	1.39053	4.50000
CT	STORAGE TANK, DW	28.54090	40.55030	28.54090	688.31	2.43042	3.47944	2.43042	1.70498
CT	LMC FURN. GAS/OIL 500 MBU	70.98641	2536.77599	48.90969	4076.10	7.43249	86.29326	7.43249	16.25000
CT	LMC FURN. GAS/OIL 2000 MBU	128.08150	5200.69285	96.83333	8005.79	7.41550	179.40781	7.41550	42.15000
CT	SURGE TANK 1000 GAL	3.64416	1103.12928	1.82208	1179.95	0.00000	0.00000	0.00000	2.60000
TF	PIPE/FITTING, 3" ST. & C.I.	0.27294	0.14243	0.27294	6.33	0.03471	0.01222	0.03471	5.37225
TF	PIPE/FITTINGS, COPPER	1.88399	15.20390	1.06243	55.33	0.03071	0.00951	0.03071	5.37225
TF	PIPE AND FITTINGS, PVC	20.04564	2350.54084	38.12325	3959.09	0.23808	1.12099	0.23808	120.95000
TF	PIPE INSULATION	21.34981	220.22661	21.34981	705.09	0.01132	0.03817	0.01132	91.00000
CT	GATE VALVE, 3/8" - 1 1/2"	0.26819	41.15104	0.26819	77.69	0.01232	0.03817	0.01232	0.26000
CT	GATE VALVE, 2" - 3"	2.52256	23.63142	2.52256	77.22	0.05930	0.02930	0.05930	0.57200
CT	DRAIN VALVE	1.20091	16.99579	1.20091	42.50	0.17836	1.04232	0.17836	0.68900
CT	RADIATOR VALVE 1"	20.93968	612.57352	10.46944	1113.99	0.00000	0.00000	0.00000	2.60000
CT	PRESSURE REDUCER VALVE 2"	28.03267	289.08347	28.03267	433.65	0.18734	5.77296	0.18734	0.71500
TF	STEAM TRAP, F & 1, <1"	6.35243	318.59373	6.35243	924.87	0.09489	0.56324	0.09489	2.60000
CT	PIPE INSULATION	6.35243	1166.09679	4.58927	1304.53	0.14118	0.34734	0.14118	91.00000
CT	CIRCULATION PUMP, <1 HP	37.65129	1407.95001	32.65071	2245.88	2.37267	15.85186	2.37267	8.39800
CT	COMP. RCVR., 10 - 15 GAL.								4.19900
CT	COOLING GENERATION EQUIPMENT								7.80000
CT	A/C DX PACKAGE 5T	42.41765	0.00000	42.41765	942.03	3.63988	0.00000	3.63988	4.19250
CT	A/C DX PACKAGE 20T	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	6.80333
CT	A/C DX PACKAGE 50T	137.45736	0.00000	137.45736	3126.60	11.82958	0.00000	11.82958	11.92750
CT	A/C WINDOW 1T	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	5.96000
CT	A/C WINDOW 2T	57.56681	0.00000	57.56681	1305.62	4.93983	0.00000	4.93983	6.50000
CT	A/C PAD MTD. 4T	114.72653	5096.74500	106.00330	7670.83	8.72191	0.00000	8.72191	3.25000
CT	CHILLER-AIR COOL RECIP.20T	262.08047	0.00000	262.08047	131.04023	22.48923	0.00000	22.48923	6.80333
CT	CHILLER-AIR COOL REC.50T	325.70694	0.00000	325.70694	5524.66	27.94904	0.00000	27.94904	7.15000
CT	CHILLER-AIR COOL REC.100T	325.70694	0.00000	325.70694	6885.90	27.94904	0.00000	27.94904	10.40000
CT	CHILLER-AIR COOL RECIP.5T	140.88719	0.00000	140.88719	3195.32	12.08950	0.00000	12.08950	18.20000
CT	CHILLER-AIR COOL REC.10T	204.51366	0.00000	204.51366	4311.15	17.54940	0.00000	17.54940	20.80000
CT	CHILLER-AIR COOL REC.15T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.20T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.50T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.100T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.10T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.20T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.50T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILLER-WAY COOL REC.100T	265.10330	0.00000	265.10330	5588.33	22.74922	0.00000	22.74922	20.80000
CT	CHILL. HERMETIC CENT. 100T	186.30358	0.00000	186.30358	8143.58	33.14886	0.00000	33.14886	24.37500
CT	CHILL. HERMETIC CENT. 300T	386.30358	0.00000	386.30358	15179.19	33.14886	0.00000	33.14886	40.62500
CT	CHILL. HERMETIC CENT. 900T	586.30358	0.00000	586.30358	23179.19	33.14886	0.00000	33.14886	40.62500

See Notes on the last page of this table for Explanation of column headings

COMPONENT DESCRIPTION	Zone: 10	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (dw 7%)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources					Annual Maintenance and Repair						
		Labor	material	equipment	D.C. Total	Washington	Labor	material	equipment	yr	Labor	material	equipment
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	2126.40		86.44703	0.00000	43.22352	117	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28		33.14886	0.00000	16.57443	117	162.50000	12720.00000	40.62500
CHILL.DBL.BIOL. HERN.100T	CT	446.90022	0.00000	223.45011	9420.66		38.34868	0.00000	19.17434	117	68.90000	41340.00000	17.22500
CHILL.DBL.BIOL. HERN.900T	CT	446.90022	0.00000	223.45011	9420.66		38.34868	0.00000	19.17434	117	107.90000	67840.00000	26.97500
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	663.77575	27942.63		113.74610	0.00000	56.87305	117	65.00000	37100.55000	44.52500
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54		16.76942	0.00000	8.38471	117	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	195.42416	0.00000	97.71208	4119.54		16.76942	0.00000	8.38471	117	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	181.78992	0.00000	90.89496	3832.13		15.59946	0.00000	7.79973	117	184.60000	125822.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	27.24840	0.00000	13.63424	518.45		2.31992	0.00000	1.15996	88	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 5T	CT	27.24840	0.00000	13.63424	574.42		2.31992	0.00000	1.15996	88	20.60000	2438.00000	6.93333
AIR COOLED CONDENSER 20T	CT	48.47731	0.00000	24.23865	1021.90		4.15986	0.00000	2.07993	88	31.20000	5994.70000	7.65300
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23865	1021.90		4.15986	0.00000	2.07993	88	46.80000	10578.80000	11.70000
AIR COOLED CONDENSER 100T	CT	53.02206	0.00000	26.51103	1117.71		4.54984	0.00000	2.27492	88	52.00000	10070.00000	13.00000
COOLING TOWER 50T	CT	145.12504	0.00000	82.56292	3480.05		14.16951	0.00000	8.25472	88	78.00000	43142.00000	32.17500
COOLING TOWER 100T	CT	192.39433	0.00000	104.32920	4053.67		17.93938	0.00000	8.96969	88	128.70000	63142.00000	45.50000
COOLING TOWER 300T	CT	209.05462	0.00000	104.32920	4406.95		18.31971	0.00000	8.41966	88	182.00000	93142.00000	56.10000
EVAPORATIVE CONDENSER 20T	CT	159.06618	0.00000	79.53309	3753.12		13.64953	0.00000	6.82477	88	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	159.06618	0.00000	79.53309	3753.12		13.64953	0.00000	6.82477	88	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	36.33798	0.00000	18.17899	766.43		3.11689	0.00000	1.55995	30	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	0.13913	0.00000	0.13913	3.16		0.01194	0.00000	0.01194	30	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79		0.64998	0.00000	0.64998	88	2.85000	1051.20000	1.43000
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79		0.64998	0.00000	0.64998	88	3.25000	1240.00000	1.62500
DIST. PIPING SYSTEM	TF	3.60420	12.45424	2.01455	89.11		0.03646	0.01903	0.03646	18	10.74450	41.34000	5.37225
PIPE/FITTINGS ST.& C.I.	TF	3.73637	32.78231	1.92700	111.83		0.01524	0.00700	0.01524	32	5.55100	51.00720	2.77550
PIPE/FITTINGS COPPER	TF	0.31989	1.68922	0.33989	9.40		0.02917	0.14495	0.02917	12	241.80000	8321.00000	120.90000
PIPE AND FITTINGS, PVC	CT	0.78195	11.91304	0.78195	29.65		0.02920	0.03676	0.02920	12	0.68900	17.91400	0.68900
GATE VALVE, 3/8" - 1 1/2"	CT	0.78195	11.91304	0.78195	29.65		0.02920	0.03676	0.02920	12	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.78195	11.91304	0.78195	29.65		0.02920	0.03676	0.02920	12	0.68900	17.91400	0.68900
DRAIN VALVE	CT	2.52256	23.63142	2.52256	80.84		0.17856	1.04232	0.17856	18	91.00000	901.00000	91.00000
PIPE INSULATION	TF	28.03267	273.05599	28.03267	608.84		0.09489	0.55344	0.09489	18	8.39800	742.00000	8.39800
CIRCULATOR PUMP < 1 HP	CT	6.30634	318.59373	6.30634	461.62		0.13723	0.34734	0.13723	9	31.20000	2544.00000	15.60000
5 TON CHILLER ACH RECIP	CT	15.92699	1166.09679	9.37655	1506.36		0.14118	8.14264	0.14118	9			
EQUIPMENT													
MULTI-ZONE 6500 CFM	CT	91.52590	2343.34777	54.52148	4300.76		7.04677	68.10075	4.47673	19	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	93.20558	5751.23202	54.94138	5042.49		7.04677	83.31508	4.47673	19	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	106.04755	9052.71719	61.37695	7994.55		7.42811	151.32417	5.23015	19	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	118.21768	12203.04048	67.75246	11572.44		7.80945	232.21017	5.23015	19	105.30000	27105.40000	26.32500
MULTI-ZONE 2500 CFM	CT	83.32038	620.09008	53.02206	2412.8		7.14975	53.21017	4.54984	68	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	90.04466	2343.34777	54.78082	4269.54		6.91966	68.10075	4.41318	19	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	91.72426	3052.19830	54.20072	5012.43		6.91966	83.31508	4.41318	19	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	104.56623	5709.14966	67.83629	7944.14		7.30099	169.33417	4.78526	19	75.40000	15359.40000	18.82500
DUAL DUCT 50,000 CFM	CT	116.73636	9055.74739	67.01180	11544.21		7.68233	232.38195	5.16559	19	105.30000	27305.40000	26.32500
3 DK.MULTI ZONE 10,000 CFM	CT	93.20558	3052.15897	54.26954	4280.32		7.04677	83.31508	4.47673	19	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 25,000 CFM	CT	106.04755	5453.33729	61.46435	5043.66		7.42811	152.15419	5.23015	19	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	118.21768	8423.01338	67.84036	7715.89		7.80945	232.38195	5.23015	19	105.30000	27305.40000	26.32500
D.D. VARI. VOL. 6500 CFM	CT	90.71650	2343.34777	54.52148	4300.76		6.91966	68.10075	4.47673	19	36.40000	5997.48000	9.10000
D.D. VARI. VOL. 10000 CFM	CT	92.73202	3272.69102	42.83885	5217.01		6.91966	83.31508	4.47673	19	42.90000	8050.70000	10.75000
D.D. VARI. VOL. 25000 CFM	CT	104.56623	4119.38387	47.01615	5348.91		7.30099	169.04578	4.78526	19	75.40000	15359.40000	18.80000
D.D. VARI. VOL. 50000 CFM	CT	119.42172	9643.03451	52.23764	12137.7		7.83233	232.38195	5.23015	19	105.30000	27305.40000	26.92500
D.D. VARI. VOL. 100,000CFM	CT	89.03490	3252.30769	42.44740	5271.96		6.91966	68.10075	4.47673	19	32.50000	5997.48000	8.25000
VARIABLE VOLUME 6500 CFM	CT	89.03490	3252.30769	42.44740	5271.96		6.91966	68.10075	4.47673	19	32.50000	5997.48000	8.25000
VARIABLE VOLUME 10000 CFM	CT	91.72426	3052.19830	54.20072	5012.43		6.91966	83.31508	4.47673	19	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	116.73636	5709.14966	67.83629	7944.14		7.80945	152.15419	5.23015	19	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	133.20338	9052.71719	81.02295	11572.43		7.80945	232.38195	5.23015	19	105.30000	27305.40000	26.92500
See NOTES on the last page of this table for Explanation of Column headings													

See notes on the last page of this table for explanation of Column headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE 64	
ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS											
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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 65
Zone: 10	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)						ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington			Annual Maintenance and Repair					
		um	labor	material	equipment	D.C. Total	Annual Maintenance and Repair		Replacement and High Costs Tasks				
							labor	material	equipment	yr	labor	material	equipment
DEVICES													
	THERMOSTATS/PNEUMATICS	CT	15.01479	48.37066	15.01479	368.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
	HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.25996	0.00000	1.25996	59	0.78000	100.26540	0.78000
	FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.25996	0.00000	1.25996	48	0.78000	100.04280	0.78000
	RADIATION SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.25996	0.00000	1.25996	26	0.78000	77.11500	0.78000
	WIND VELOCITY SENSOR	CT	14.93336	18.89371	14.93336	357.58	1.25366	0.00000	1.25366	13	0.78000	45.52700	0.78000
	PRESSURE SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.25996	0.00000	1.25996	26	0.78000	58.30000	0.78000
	DAMPEN CONTROLLER/ELECT.	CT	15.48508	74.21429	15.48508	425.42	1.27113	0.00000	1.27113	19	2.60000	287.20700	2.60000
	SIMPLEX AIR COMPRESSOR, 1 HP	CT	39.60935	39.76626	28.54395	909.71	3.42079	3.41236	2.44937	32	3.67000	6103.82980	1.83950
See NOTES on the last page of this table for Explanation of Column Headings													

COMPONENT DESCRIPTION	Zone: 11	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks					
		labor	material	equipment	Washington D.C. Total	labor	material	equipment	yr	labor	material	equipment	labor	material	equipment
HVAC															
NATURAL GAS SYSTEM															
EQUIPMENT															
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000			
PIPING SYSTEM															
PIPE/FITTINGS, STEEL/IRON	TF	9.09658	16.23070	4.58497	208.11	0.78058	1.39354	0.39344	55	1074.4500	1929.20000	537.22500			
PRESS. REDUCING VALVE, 5"	CT	0.28912	19.67273	0.38912	22.50	0.01740	0.00000	0.01740	10	0.26000	19.08000	0.26000			
PRESS. REDUCING VALVE, 2"	CT	0.64996	231.67678	0.42638	245.70	0.01740	0.00000	0.01740	10	0.62400	323.30000	0.31200			
FUEL OIL SYSTEMS															
STORAGE SYSTEMS															
OIL STORAGE TANK, 275 GAL.	CT	0.58682	37.08251	0.29341	49.45	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000			
OIL FILTER	CT	1.21193	39.32765	1.21193	67.1	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000			
FUEL LEVEL METER	CT	0.72663	160.23364	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000			
DISTRIBUTION SYSTEM															
PIPE/FITTINGS, COPPER	TF	17.53453	311.85810	8.85443	681.77	0.18758	0.35299	0.10127	18	55.51000	1113.00000	27.75500			
LPG SYSTEM															
STORAGE SYSTEM															
LPG STORAGE TANK, 1000 GAL	CT	1.17364	355.27437	0.58682	380.01	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000			
DISTRIBUTION SYSTEM															
PIPE/FITTINGS, STEEL/IRON	TF	9.02323	16.20162	4.51162	206.41	0.77429	1.39025	0.38714	55	1074.4500	1929.20000	537.22500			
STEAM, CENTRAL															
PRESS. RED. /REG. SYSTEM															
STEAM CONVERTOR, <300,000	CT	22.43693	265.49930	21.34831	770.89	1.73849	1.65450	1.73849	18	7.35800	832.10000	3.67900			
FLASH TANK, 24 GAL.	CT	22.08509	139.81152	19.35574	631.97	1.39053	1.37923	1.39053	9	13.00000	294.68000	6.50000			
STEAM REG. VALVE 2"	CT	20.93988	672.57552	10.46964	1113.99	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000			
COND. METER, <300 #/HR.	CT	7.98239	525.16285	7.98239	706.20	0.67238	25.56145	0.67238	22	0.65000	1007.00000	0.65000			
VALVES															
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500			
EQUIPMENT															
CAST IRON RADIATOR, 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000			
BASEBOARD RADIATOR, 10 FT	CT	3.33372	148.82495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000			
FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000			
SOLAR															
EQUIPMENT															
SOLAR PANEL, 3' X 8'	CT	2.73312	245.13984	1.36656	302.75	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000			
SOLAR STORAGE TANK, 1000GAL	CT	5.65344	795.17808	2.82672	914.35	0.00000	0.00000	0.00000	15	15.60000	2194.20000	7.80000			
PIPING SYSTEM															
PIPE/FITTINGS, PVC	TF	0.08492	0.00784	0.08492	1.93	0.00729	0.00067	0.00729	53	41.70530	669.12500	20.85265			
HEATING GENERATION															
EQUIPMENT															
BOILER GAS 250 KBTU/HR	CT	462.23272	1639.63596	452.61597	12092.30	38.01394	60.22264	38.01394	18	65.00000	3169.40000	32.50000			
BOILER GAS 2000 KBTU/HR	CT	549.22885	5804.34884	508.26149	18129.76	42.44231	116.36814	42.44231	18	184.60000	15032.92000	45.15000			
BOILER GAS 10,000 KBTU/HR	CT	583.57066	19303.29970	528.38033	32362.08	43.76188	687.49191	43.76188	18	248.69000	33140.00000	46.17250			
BOILER COAL 40,000 KBTU/HR	CT	7802.0534	254082.00000	2140.9264	412916.97	101.33829	0.00000	68.08094	12	10800.000	63400.00000	4160.0000			
REPAIR BOILER															
BOILER COAL 100,000 KBTU/HR	CT	14314.375	593365.10400	3521.4362	883477.73	121.98952	0.00000	78.40655	12	1131.7800	159000.00000	8520.0000			
REPAIR BOILER															
BOILER OIL 250 KBTU/HR	CT	536.95058	1427.20208	522.52566	13559.08	44.42551	41.99340	44.42551	18	65.00000	3169.40000	32.50000			
BOILER OIL 2000 KBTU/HR	CT	616.71760	4937.61765	575.75024	18793.68	48.23355	41.99340	48.23355	18	184.60000	15032.92000	45.15000			
BOILER OIL 10,000 KBTU/HR	CT	691.78689	11837.33963	634.59636	27350.46	53.04794	46.83494	53.04794	18	248.69000	33140.00000	46.17250			
BOILER GAS/OIL 2000 KBTU/HR	CT	569.94939	6370.54760	528.98204	19145.90	44.23035	72.07792	44.23035	18	184.60000	15032.92000	45.15000			
BOILER GAS/OIL 20000 KBTU	CT	731.05042	34152.33439	584.51047	52270.13	46.16437	129.96482	46.16437	18	248.69000	18689.92000	46.15000			
BOILER PNEUMATIC COAL SPREAD.	CT	2361.0873	8412.02674	2189.1576	21612.13	180.23881	173.00206	179.19098	7	64.00000	11236.00000	91.00000			
ASH HANDLING SYSTEM	CT	10231.013	13764.02460	5225.8048	35842.73	305.79160	148.52274	305.79160	12	104.00000	21200.00000	2600.0000			
FUEL OIL EQUIPMENT	CT	13.43164	260.30032	8.71592	343.34	0.48270	0.55749	0.48270	9	5.20000	604.20000	2.60000			
CHEMICAL FEED SYSTEM	CT	7.75886	368.69900	8.10392	343.64	0.00000	0.00000	0.00000	9	5.20000	778.04000	3.25000			
FEED-WATER SUPPLY	CT	232.87288	2314.58880	218.86739	7390.32	0.00000	0.00000	0.00000	9	57.20000	5512.00000	19.06667			
GENERATOR	CT	582.04738	13591.32000	149.55219	21511.53	18.48024	0.00000	9.24012	12	260.00000	21200.00000	65.00000			

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	UM	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Labor			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr.	labor	material	equipment	yr.
Zone: 11													
BLOWOFF SYSTEM	CT	2.18348	123.73613	1.09174	169.76	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000	9
HOUSE FURN. GAS 25KBTU/HR	CT	56.39138	681.80350	52.02442	1946.50	0.35004	32.89178	0.35004	9	20.80000	710.20000	10.40000	9
HOUSE FURN. GAS 20KBTU/HR	CT	65.18905	854.80350	56.43513	2305.34	0.35253	36.35864	0.35253	9	41.60000	943.40000	20.80000	9
HOUSE FURN. OIL 25KBTU/HR	CT	70.51255	1256.57721	66.14559	3509.23	0.35253	47.03395	0.35253	9	20.80000	3572.20000	10.40000	9
HOUSE FURN. OIL 10KBTU/HR	CT	79.24647	1734.66698	70.51255	3804.03	0.35253	46.71748	0.35253	9	41.60000	696.00000	20.80000	9
HOUSE FURN. OIL 20KBTU/HR	CT	35.07873	764.60620	30.71177	1546.22	0.35253	59.65120	0.35253	9	41.60000	2716.99200	20.80000	9
HOUSE FURN. ELECT. 10KBTU	CT	43.81265	1005.13297	35.07873	1970.86	0.45125	32.11130	0.45125	9	20.80000	1202.00000	10.40000	9
HOUSE FURN. ELECT. 20KBTU/H	CT	43.81265	1261.92796	35.07873	2247.65	0.45125	41.25410	0.45125	9	41.60000	1908.00000	20.80000	9
CASE IRON RADIATOR 10 SET	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000	30
BASEBOARD RADIATOR 10 SET	CT	3.33372	148.02495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000	12
FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000	12
EXPANSION TANK	CT	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.00000	10	3.47100	135.68000	1.73550	10
STEAM CONVERTER, <300,000	CT	22.09729	265.49030	21.00667	763.18	1.70935	1.65450	1.70935	18	7.35800	832.10000	3.67900	18
FLASH TANK, 24 GAL.	CT	22.08509	139.81152	28.37686	631.97	2.43503	3.45722	2.43503	37	3.59395	346.62000	1.79698	37
STORAGE TANK, 24 GAL.	CT	28.37686	40.28901	28.37686	683.88	4.83249	86.29326	3.88224	22	65.00000	6784.00000	16.25000	22
IND. FURN. GAS/OIL 500 MBTU	CT	70.58644	2334.77590	48.90969	4076.10	7.41550	179.40781	7.41550	11	5.20000	1574.10000	2.60000	11
IND. FURN. GAS/OIL 2000 MBTU	CT	128.08150	5200.89283	96.83333	8005.79	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000	11
SURGE TANK, 1000 GAL	CT	3.64416	1103.12928	1.82208	1179.95	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000	11
DIST. PIPING SYSTEM	TF	0.27294	0.14243	0.27294	6.33	0.02342	0.01222	0.02342	38	10.74450	41.34000	5.37225	38
PIPE/FITTINGS, ST. & C.I.	TF	1.88309	15.20390	1.06562	55.30	0.02342	0.00951	0.02342	38	10.74450	41.34000	5.37225	38
PIPE/FITTINGS, COPPER	TF	69.51564	2234.83374	36.06879	3704.33	0.22808	1.12089	0.22808	18	24.10000	8034.80000	120.90000	18
PIPE AND FITTINGS, PVC	TF	21.36981	220.42641	21.36981	705.09	0.07132	0.43837	0.07132	12	91.00000	956.00000	91.00000	12
PIPE INSULATION	CT	1.62144	11.91304	1.62144	48.69	0.02342	0.00951	0.02342	38	10.74450	41.34000	5.37225	38
GATE VALVE, 3/8" - 1 1/2"	CT	0.70819	61.15463	0.70819	77.22	0.02342	0.00951	0.02342	38	10.74450	41.34000	5.37225	38
GATE VALVE, 2" - 3"	CT	2.52256	23.63142	2.52256	80.84	0.02342	0.00951	0.02342	38	10.74450	41.34000	5.37225	38
DRAIN VALVE	CT	2.52256	16.98479	0.60046	42.30	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000	4
RADIATOR VALVE 1"	CT	1.20091	672.57552	10.46994	1113.99	0.18754	5.77596	0.18754	18	91.00000	956.00000	91.00000	18
PRESSURE REDUCER VALVE 2"	CT	10.80226	188.65387	10.80226	433.65	0.09489	0.58324	0.09489	9	8.39800	742.00000	8.39800	9
PIPE TRAP F & T, <1"	CT	28.03267	289.08547	28.03267	924.87	0.14118	0.34734	0.14118	9	8.39800	742.00000	8.39800	9
PIPE INSULATION	CT	6.35243	318.59373	6.35243	462.67	0.14118	0.34734	0.14118	9	8.39800	742.00000	8.39800	9
CIRCULATION PUMP < 1 HP	CT	37.65129	1166.09679	4.58927	1304.53	2.37267	15.85186	2.37267	12	15.60000	1908.00000	7.80000	12
CIRCULATION PUMP 5 HP	CT	37.65129	1166.09679	4.58927	1304.53	2.37267	15.85186	2.37267	12	15.60000	1908.00000	7.80000	12
COND. RECV. 10 - 15 GAL.	CT	37.65129	1166.09679	4.58927	1304.53	2.37267	15.85186	2.37267	12	15.60000	1908.00000	7.80000	12
COOLING GENERATION													
EQUIPMENT													
A/C DX PACKAGE 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	385	8.38500	1855.00000	4.19250	385
A/C DX PACKAGE 20T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	385	20.41000	7950.00000	6.80233	385
A/C DX PACKAGE 50T	CT	137.85734	0.00000	137.85734	3126.60	11.82959	0.00000	11.82959	385	47.71000	21200.00000	11.92750	385
A/C WINDOW 1T	CT	10.49391	0.00000	10.49391	446.66	1.68994	0.00000	1.68994	192	5.98000	530.00000	5.98000	192
A/C WINDOW 2T	CT	19.69391	0.00000	19.69391	893.32	1.68994	0.00000	1.68994	192	5.98000	530.00000	5.98000	192
A/C PAD MTD. 4T	CT	57.56681	5096.74500	106.00330	1305.62	4.93983	0.00000	4.93983	192	6.50000	1484.00000	3.25000	192
A/C PAD MOUNTED 20 TON	CT	114.72693	5096.74500	106.00330	1305.62	4.93983	0.00000	4.93983	192	6.50000	1484.00000	3.25000	192
CHILLER-AIR COOL RECIP. 20T	CT	282.08047	0.00000	282.08047	5524.66	22.68923	0.00000	22.68923	385	28.60000	10759.00000	7.15000	385
CHILLER-AIR COOL REC. 50T	CT	325.70694	0.00000	325.70694	6825.90	27.04964	0.00000	27.04964	385	40.30000	19080.00000	10.07500	385
CHILLER-AIR COOL REC. 100T	CT	140.88719	0.00000	140.88719	3195.32	12.09259	0.00000	12.09259	385	15.60000	3710.00000	5.20000	385
CHILLER-AIR COOL RECIP. 5T	CT	204.51366	0.00000	204.51366	4311.15	12.09259	0.00000	12.09259	385	15.60000	3710.00000	5.20000	385
CHILLER-AIR COOL REC. 10T	CT	265.11030	0.00000	265.11030	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILLER-WAT COOL REC. 20T	CT	265.11030	0.00000	265.11030	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILLER-WAT COOL REC. 50T	CT	265.11030	0.00000	265.11030	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILLER-WAT COOL REC. 100T	CT	234.81198	0.00000	234.81198	4949.84	20.14931	0.00000	20.14931	385	24.10000	5300.00000	18.25000	385
CHILLER-WAT COOL REC. 20T	CT	386.30358	0.00000	386.30358	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILLER-WAT COOL REC. 50T	CT	386.30358	0.00000	386.30358	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILLER-WAT COOL REC. 100T	CT	386.30358	0.00000	386.30358	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILL. HERMETIC CENT. 100T	CT	386.30358	0.00000	386.30358	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILL. HERMETIC CENT. 300T	CT	386.30358	0.00000	386.30358	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385
CHILL. HERMETIC CENT. 900T	CT	386.30358	0.00000	386.30358	5588.53	22.74922	0.00000	22.74922	385	29.40000	9540.00000	7.47500	385

See Notes on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Yr			
		Labor	material	equipment	D.C. Total	Labor	material	equipment		Labor	material	equipment	
Zone: 11													
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352		385	97.50000	24.37500	
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443		385	162.50000	40.62500	
CHILL. DBL. BNL. NERM. 100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434		385	68.90000	17.22500	
CHILL. DBL. BNL. NERM. 300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434		385	107.90000	26.97500	
CHILL. DBL. BNL. NERM. 900T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434		385	139.90000	44.52500	
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305		385	65.00000	16.25000	
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471		385	104.00000	26.00000	
CHILL. ONE STG. ABS. 900T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471		385	167.70000	41.92500	
CHILL. TWO STG. ABS. 300T	CT	181.78992	0.00000	90.89496	3832.13	15.59646	0.00000	7.79973		385	114.00000	28.60000	
CHILL. TWO STG. ABS. 900T	CT	27.26840	0.00000	27.26840	618.45	2.33992	0.00000	2.33992		385	184.00000	46.50000	
AIR COOLED CONDENSER 5T	CT	27.26840	0.00000	13.63424	574.82	2.33992	0.00000	1.16996		288	9.10000	4.55000	
AIR COOLED CONDENSER 20T	CT	48.47731	0.00000	24.23866	1021.90	4.15086	0.00000	2.07993		288	31.20000	7.80000	
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1021.90	4.15086	0.00000	2.07993		288	46.80000	11.70000	
AIR COOLED CONDENSER 100T	CT	53.02206	0.00000	26.51103	1177.71	4.51084	0.00000	2.26192		288	46.80000	11.70000	
COOLING TOWER 50T	CT	165.12584	0.00000	82.56292	3480.45	14.16084	0.00000	7.08472		288	52.00000	13.00000	
COOLING TOWER 100T	CT	192.39433	0.00000	96.19717	4053.87	17.35938	0.00000	8.69472		288	78.90000	19.50000	
COOLING TOWER 300T	CT	209.05841	0.00000	104.52920	4405.95	18.31971	0.00000	9.15955		288	100.00000	25.02500	
EVAPORATIVE CONDENSER 20T	CT	159.06518	0.00000	79.53309	3533.12	13.64953	0.00000	6.82477		288	182.00000	45.50000	
EVAPORATIVE CONDENSER 100T	CT	36.35798	0.00000	18.17899	766.43	3.01194	0.00000	1.55995		288	182.00000	45.50000	
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.01194	0.00000	1.55995		288	182.00000	45.50000	
EXPANSION TANK	CT	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.01194		30	3.47100	1.35500	
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998		288	2.80000	1.30000	
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998		288	2.80000	1.30000	
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998		283	3.25000	1.62500	
DIST. PIPING SYSTEM	TF	3.60420	12.45424	2.01455	89.11	0.03646	0.01903	0.03646		18	10.74450	5.37225	
PIPE/FITTINGS ST. & C.I.	TF	32.78231	32.78231	1.95700	111.83	0.01524	0.00700	0.01524		12	5.55100	2.77550	
PIPE/FITTINGS COPPER	TF	0.24234	1.20433	0.24234	6.70	0.02080	0.10335	0.02080		44	24.18000	120.90000	
PIPE AND FITTINGS PVC	TF	0.78195	1.91304	0.78195	29.65	0.02920	0.03676	0.02920		12	0.68900	0.68900	
GATE VALVE 3/8" - 1 1/2"	CT	0.70819	61.15463	0.70819	77.22	0.02930	0.07352	0.02930		12	0.57200	0.57200	
GATE VALVE 2" - 3"	CT	2.52256	23.63142	2.52256	80.84	0.17856	1.04232	0.17856		12	0.68900	0.68900	
DRAIN VALVE	CT	28.03267	273.05599	28.03267	908.84	0.09489	0.55348	0.09489		18	91.00000	91.00000	
PIPE INSULATION	CT	6.30634	318.53733	6.30634	461.62	0.13723	0.34734	0.13723		9	8.39600	8.39600	
CIRCULATOR PUMP < 1 HP	CT	15.92699	1166.09679	9.37655	1506.36	0.14118	8.14264	0.14118		9	31.20000	15.60000	
5 TON CHILLER ACH RECIP	CT	83.78198	808.82875	53.25286	2611.31	7.18937	69.40591	4.50591		26	36.40000	5997.48000	
HEAT/COOL GENERATION	CT	83.78198	990.14166	57.22066	2792.64	7.18937	84.96618	4.50591		26	42.90000	9.10000	
EQUIPMENT	CT	88.32673	1796.65058	57.72048	3701.06	7.57935	154.17129	4.50591		26	75.40000	10.72500	
MULTI-ZONE 6500 CFM	CT	92.82707	2031.71176	52.03542	4040.10	7.94934	174.34199	5.31302		26	103.30000	18.85000	
MULTI-ZONE 10,000 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
MULTI-ZONE 25,000 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
MULTI-ZONE 50,000 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
DUAL DUCT 6500 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
DUAL DUCT 10,000 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
DUAL DUCT 25,000 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
DUAL DUCT 50,000 CFM	CT	82.82707	908.82875	52.03542	2412.84	7.18937	69.40591	4.50591		26	36.40000	26.32500	
3 DK. MULTI ZONE 6500 CFM	CT	83.78198	808.82875	53.25286	2611.31	7.18937	69.40591	4.50591		26	36.40000	5997.48000	
3 DK. MULTI ZONE 10,000 CFM	CT	83.78198	991.15005	53.25286	2793.63	7.18937	85.05093	4.50591		26	42.90000	10.72500	
3 DK. MULTI ZONE 25,000 CFM	CT	88.32673	1511.31032	57.79761	3416.87	7.57935	129.68613	4.50591		26	75.40000	18.85000	
3 DK. MULTI ZONE 50,000 CFM	CT	92.82707	1799.73384	62.34236	3808.37	7.94934	154.43587	5.31302		26	103.30000	26.32500	
D.D. VARI. VOL. 6500 CFM	CT	82.82707	808.82875	41.13353	2543.02	7.05937	69.40591	3.52968		26	36.40000	26.32500	
D.D. VARI. VOL. 10000 CFM	CT	991.15005	991.15005	41.13353	2725.34	7.05937	95.05098	3.52968		26	42.90000	10.72500	
D.D. VARI. VOL. 25000 CFM	CT	86.81182	1770.53767	43.40591	3600.53	7.44936	151.93053	3.72468		26	83.20000	21.70000	
D.D. VARI. VOL. 50000 CFM	CT	91.35656	2013.63274	45.67828	3939.43	7.83934	172.79062	3.91967		26	115.70000	28.92500	
D.D. VARI. VOL. 100,000CFM	CT	90.89496	3355.89786	45.44748	5271.96	7.79973	287.79092	3.89987		26	169.00000	42.25000	
VARIABLE VOLUME 6500 CFM	CT	82.26707	808.82875	52.03267	2673.91	7.05937	69.40591	3.52968		26	36.40000	26.32500	
VARIABLE VOLUME 10000 CFM	CT	82.26707	991.15005	52.03267	2761.70	7.05937	85.05098	3.52968		26	42.90000	10.72500	
VARIABLE VOLUME 25000 CFM	CT	82.26707	1124.68045	38.86116	2586.00	5.88941	96.50927	3.33469		26	75.40000	18.85000	

See NOTES on the last page of this table for Explanation of Column Headings



Zone: 11	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (cf 7x)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
CT	VARIABLE VOLUME 50000 CFM	91.3566	2031.7176	61.88490	4008.41	7.83934	174.34199	5.28462	26	105.30000	27305.60000	26.32500	
CT	TERM. REHEAT 6500 CFM	101.00111	3771.65216	55.48514	5916.71	6.71253	66.31211	4.27260	11	32.50000	4279.22000	9.42500	
CT	TERM. REHEAT 10000 CFM	104.64527	5276.42119	56.39618	7495.38	7.07906	81.01631	4.27260	11	37.70000	6181.92000	9.42500	
CT	TERM. REHEAT 25000 CFM	132.60374	12401.51391	66.58938	15197.72	7.44559	145.62661	5.00566	11	71.50000	15274.60000	17.87500	
CT	TERM. REHEAT 50000 CFM	166.02846	17986.85344	78.14914	21471.17	7.44559	169.13662	5.00566	11	113.10000	22853.60000	26.27500	
CT	2 PIPE INDUCTION 6500 CFM	101.00111	3771.65216	55.48514	5916.71	6.71253	66.31211	4.27260	11	32.50000	4279.22000	9.42500	
CT	2 PIPE INDUCTION 10000 CFM	104.64527	5276.42119	56.39618	7495.38	7.07906	81.01631	4.27260	11	37.70000	6181.92000	9.42500	
CT	2 PIPE INDUCTION 25000 CFM	132.60374	12401.51391	66.58938	15197.72	7.44559	145.62661	5.00566	11	71.50000	15274.60000	17.87500	
CT	2 PIPE INDUCTION 50000 CFM	166.02846	17986.85344	78.14914	21471.17	7.44559	169.13662	5.00566	11	113.10000	22853.60000	26.27500	
CT	4 PIPE INDUCTION 6500 CFM	84.30641	836.68902	53.51518	2650.23	7.07906	71.79661	4.48485	288	37.70000	6181.92000	9.42500	
CT	4 PIPE INDUCTION 10000 CFM	86.35021	984.73269	52.26440	2745.55	7.07906	84.50030	4.48485	288	37.70000	6181.92000	9.42500	
CT	4 PIPE INDUCTION 25000 CFM	100.39496	1757.25129	56.80935	3621.14	7.49973	150.79042	5.26482	288	113.10000	22853.60000	26.27500	
CT	4 PIPE INDUCTION 50000 CFM	126.39496	2000.34336	61.35410	3967.31	7.49973	171.65051	5.26482	288	113.10000	22853.60000	26.27500	
CT	2 PIPE FAN COIL 600 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	699.50000	1.30000	
CT	2 PIPE FAN COIL 1200 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	699.50000	1.30000	
CT	2 PIPE FAN COIL 2400 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	699.50000	1.30000	
CT	4 PIPE FAN COIL 600 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	699.50000	1.30000	
CT	4 PIPE FAN COIL 1200 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	699.50000	1.30000	
CT	4 PIPE FAN COIL 2400 CFM	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	699.50000	1.30000	
CT	UNIT VENT 400 CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	SIN-ZONE DRAW THRU 6500CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	SIN-ZONE DRAW THRU 10000CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	SIN-ZONE DRAW THRU 25000CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	SIN-ZONE DRAW THRU 50000CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	SIN-ZONE DRAWTHRU 10000CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	SIN-ZONE DRAWTHRU 25000CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	UNIT HEATER 400 CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	UNIT HEATER 1200 CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	UNIT HEATER 4000 CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	UNIT HEATER 2000 CFM	21.20882	18.52859	12.11933	499.54	1.81994	1.58995	1.81994	288	3.25000	1590.00000	1.82000	
CT	GASFIRED RADIANT HTR 50MBH	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	288	2.60000	445.20000	1.30000	
CT	HEAT PUMP 5T	42.41745	0.00000	42.41745	962.03	3.63988	0.00000	3.63988	385	8.35500	2994.50000	4.19250	
CT	HEAT PUMP 10T	107.55904	0.00000	107.55904	2439.44	9.23968	0.00000	9.23968	385	14.30000	5989.00000	4.76627	
CT	HEAT PUMP 25T	137.45736	0.00000	137.45736	3126.60	11.83959	0.00000	11.83959	385	19.50000	7755.00000	4.76627	
CT	HEAT PUMP 11	47.64916	77.78933	47.64916	1158.67	4.08879	6.87513	4.08879	35	5.53800	1272.00000	2.16900	
CT	DUCT/COIL 1-ROW H.W. 12X24	30.29832	0.00000	15.14916	638.69	2.59991	0.00000	2.59991	44	2.34000	80.56000	1.17000	
CT	VENTILATION SYSTEM												
CT	FIXTURES												
CT	FORCE DRAFT FAN 10,000 CFM	59.32774	1280.85073	52.26094	2603.79	4.28240	21.23836	4.28240	15	26.00000	2851.40000	6.50000	
CT	IND DRAFT FAN 10000 CFM	60.56466	1328.47348	52.81940	2675.49	4.36854	22.71397	4.33547	15	26.00000	2929.84000	6.50000	
CT	EXHAUST SYSTEM EQUIPMENT												
CT	EXHAUST FAN <200 CFM	8.16045	44.37548	8.16045	229.45	0.52146	1.52023	0.52146	12	3.25000	41.58380	3.25000	
CT	EXHAUST FAN 1000 CFM	16.05555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000	
CT	EXHAUST FAN 10,000 CFM	66.84311	1419.56275	53.59115	2893.16	4.30549	22.50479	4.24109	12	26.00000	1805.18000	6.50000	
CT	EXHAUST FAN 25,000 CFM	66.84311	3429.40404	29.25441	4825.12	4.30549	68.02087	2.15275	12	26.00000	4112.80000	6.50000	
CT	EXHAUST FAN 50,000 CFM	71.01026	4309.47116	54.63294	5867.58	4.30549	72.39600	4.24109	12	32.50000	5406.00000	8.12500	
CT	EXHAUST FAN 5000 CFM	15.53383	6.41756	15.34150	358.11	1.33296	0.00000	1.31646	35	15.60000	1632.40000	7.80000	
CT	AIR CURTAIN, 1000 CFM	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	385	3.25000	689.00000	3.25000	
CT	FIXTURES												
CT	METAL FLUE/CHIMNEY												
CT	SPECIAL SYSTEM												
CT	HUMIDITY CONTROL SYSTEM												
CT	ROOM HUMIDIFIER, FLOOR TYPE												
CT	CONTROLS/INSTRUMENT												
CT		7.50686	145.32860	7.50686	315.58	0.06573	0.80394	0.06573	6	0.26000	169.60000	0.26000	

See notes on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE	70
Zone: 11	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C= 7%)												ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS	
		By Resources						Washington D.C. Total						Annual Maintenance and Repair	
		Labor		material		equipment		Labor		material		equipment		Replacement and High Costs Tasks	
		Un												Yr	material equipment
DEVICES		CI	15.01479	48.37966	15.01479	15.14916	388.92	1.27113	0.00000	1.27113	0.00000	1.27113	20	0.78000	0.78000
THERMOSTATS/PNEUMATICS		CI	15.14916	0.00000	15.14916	15.14916	343.58	1.29996	0.00000	1.29996	0.00000	1.29996	192	0.78000	0.78000
HUMIDITY SENSOR		CI	15.14916	0.00000	15.14916	15.14916	343.58	1.29996	0.00000	1.29996	0.00000	1.29996	288	0.78000	0.78000
FLOW SENSOR		CI	15.14916	0.00000	15.14916	15.14916	343.58	1.29996	0.00000	1.29996	0.00000	1.29996	35	0.78000	0.78000
RADIATION SENSOR		CI	14.99529	13.47144	14.99529	14.99529	353.56	1.26695	0.00000	1.26695	0.00000	1.26695	18	0.78000	0.78000
WIND VELOCITY SENSOR		CI	15.14916	0.00000	15.14916	15.14916	343.58	1.29996	0.00000	1.29996	0.00000	1.29996	35	0.78000	0.78000
PRESSURE SENSOR		CI	15.14916	0.00000	15.14916	15.14916	343.58	1.29996	0.00000	1.29996	0.00000	1.29996	26	0.78000	0.78000
DAMPER CONTROLLER/ELECT.		CI	33.73635	33.56894	23.42745	772.12	2.89493	2.89493	2.89493	2.89493	2.89493	2.89493	44	3.67900	2.60000
SIMPLEX AIR COMP. 1 HP		CI													1.83950
See NOTES on the last page of this table for Explanation of Column Headings															
														6103.82960	

### Notes

1. The resources listed in this table are as of the Date of Study (DOS) and have been calculated using a present worth discount factor (d) of 7 percent. The Date of Study (DOS) is the Beneficial Occupancy Date (BOD). All tasks are assumed to occur at the end of the year. All resources have been assumed to be constant with no differential escalation from year to year.

2. Component Description - This column contains an indented list of systems, subsystems, components, and high cost task descriptions.

3. Unit of Measure (UM) - This column contains a two-character code to indicate the measurement unit for the component. Units used in this column are as follows:

CT	Count
LF	Linear Foot
SF	Square Foot
TF	Thousands of Linear Feet

4. Labor - Labor resources can be used in one of two ways: (1) labor hours per unit of measure, or (2) dollars per unit of measure assuming a \$1.00/hr labor rate.

5. Materials - Material resources are expressed in dollars per unit of measure in July 1988 dollars for the Washington, DC, area.

6. Equipment - Equipment resources can be used in one of two ways: (1) equipment hours per unit of measure, or (2) dollars per unit of measure assuming a \$1.00/hr equipment rate.

7. Washington, DC, Total - The dollars per unit of measure figures were calculated by applying the Military District of Washington labor and equipment rates to the labor and equipment resources, then adding the labor, material, and equipment costs together to form one total cost figure.

8. Year (YR) - This column contains the average age of the component when the high cost task or replacement task would be performed.

9. Engineered Performance Standards (EPS) - Most labor and equipment resource data is based on the DOD series of Technical Bulletins as discussed in the body of the report.

**APPENDIX B:**

**LIFE-CYCLE COST ANALYSIS (10 PERCENT)**

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE 16					
Zone: 1	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS													
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks									
		Washington		D.C. Total		labor		material		equipment		yr		labor		material		equipment	
		um	labor	material	equipment	labor	material	equipment	yr	labor	material	equipment	yr	labor	material	equipment			
NATURAL GAS SYSTEM																			
EQUIPMENT																			
GAS METER	CT	0.06689	16.90647	0.06689															
PIPING SYSTEM	TF	0.00000	0.00000	0.00000															
PIPE/FITTINGS, STEEL/IRON	CT	0.15230	0.00000	0.15230															
PRESS. REDUCING VALVE, 2"	CT	0.15230	0.00000	0.15230															
FUEL OIL SYSTEM																			
STORAGE SYSTEMS																			
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000															
OIL FILTER	CT	0.74387	24.26162	0.74387															
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525															
DISTRIBUTION SYSTEM	TF	0.00000	0.00000	0.00000															
PIPE/FITTINGS, COPPER																			
LPG SYSTEM																			
STORAGE SYSTEM																			
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000															
DISTRIBUTION SYSTEM	TF	0.00000	0.00000	0.00000															
PIPE/FITTINGS, STEEL/IRON																			
STEAM, CENTRAL																			
PRESS. RED. / REG. SYSTEM	CT	0.82308	0.75910	0.82308															
STEAM CONVERTOR, <300,000	CT	1.04415	0.75910	1.04415															
FLASH TANK, 24 GAL.	CT	0.68640	22.04673	0.68640															
STEAM REG. VALVE 2"	CT	4.38269	0.00000	4.38269															
COND. METER, <300 #/HR.	CT	0.00000	0.00000	0.00000															
VALVES	CT	0.00000	0.00000	0.00000															
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000															
EQUIPMENT																			
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000															
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000															
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000															
SOLAR																			
EQUIPMENT																			
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000															
SOLAR STORAGE TANK, 1000GAL	CT	0.00000	0.00000	0.00000															
PIPING SYSTEM	CT	0.00000	0.00000	0.00000															
PIPE/FITTINGS, PVC	CT	0.00000	0.00000	0.00000															
HEATING GENERATION	TF	0.19568	0.96639	0.16613															
EQUIPMENT																			
BOILER GAS 250 KBTU/HR	CT	270.65546	0.00000	270.65546															
BOILER GAS 2000 KBTU/HR	CT	303.74564	0.00000	303.74564															
BOILER GAS 10,000 KBTU/HR	CT	513.17256	0.00000	513.17256															
BOILER COAL 40,000 KBTU/HR	CT	743.37124	0.00000	743.37124															
BOILER COAL 100,000 KBTU/HR	CT	895.33483	0.00000	895.33483															
BOILER OIL 250 KBTU/HR	CT	303.02802	0.00000	303.02802															
BOILER OIL 2000 KBTU/HR	CT	343.94090	0.00000	343.94090															
BOILER GAS/OIL 2000 KBTU/HR	CT	379.27474	0.00000	379.27474															
BOILER GAS/OIL 2000 KBTU/HR	CT	312.32640	0.00000	312.32640															
BOILER GAS/OIL 20000 KBTU	CT	326.27397	0.00000	326.27397															
BOILER PNEUMAT. COAL SPREAD.	CT	1449.7087	0.00000	1449.7087															
ASH HANDLING SYSTEM	CT	2308.9331	0.00000	2308.9331															
FUEL OIL EQUIPMENT	CT	3.71935	0.00000	3.71935															
CHEMICAL FEED SYSTEM	CT	4.64919	0.00000	4.64919															
FEED-WATER SUPPLY	CT	139.47570	0.00000	139.47570															
DEAERATOR	CT	139.47570	0.00000	139.47570															
BLOWOFF SYSTEM	CT	0.00000	0.00000	0.00000															
HOUSE TURN GAS 25KBTU/HR	CT	28.82498	0.00000	28.82498															

See NOTES on the last page of this table for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	Zone: 1	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Labor			
		Washington				Material				Equipment			
		Labor	Material	Equipment	D.C. Total	Labor	Material	Equipment	yr	Labor	Material	Equipment	
HOUSE FURN GAS 100KBTU/HR	CT	28.82498	0.00000	28.82498	653.75	4.03000	0.00000	4.03000	57	20.80000	471.70000	10.40000	
HOUSE FURN GAS 200KBTU/HR	CT	28.82498	0.00000	28.82498	653.75	4.03000	0.00000	4.03000	57	20.80000	1786.10000	10.40000	
HOUSE FURN OIL 100KBTU/HR	CT	38.12336	0.00000	38.12336	864.64	5.33000	0.00000	5.33000	57	10.40000	848.00000	5.20000	
HOUSE FURN OIL 200KBTU/HR	CT	38.12336	0.00000	38.12336	864.64	5.33000	0.00000	5.33000	57	10.40000	1358.49600	10.40000	
HOUSE FURN ELECT 100KBTU	CT	13.94757	0.00000	13.94757	316.33	1.95000	0.00000	1.95000	57	10.40000	1595.30000	5.20000	
HOUSE FURN ELECT 200KBTU	CT	13.94757	0.00000	13.94757	316.33	1.95000	0.00000	1.95000	57	10.40000	601.02000	5.20000	
HOUSE FURN ELECT 200KBTU/H	CT	13.94757	0.00000	13.94757	316.33	1.95000	0.00000	1.95000	57	10.40000	751.27500	10.40000	
CASE IRON RADIATOR 10 SET	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	5.20000	954.00000	10.40000	
BASEBOARD RADIATOR 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	175.96000	2.60000	
FINISHED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	232.14000	2.60000	
EXPANSION TANK	CT	0.00502	0.00000	0.00502	0.11	0.00070	0.00000	0.00070	189	3.47100	135.48000	1.73550	
STEAM CONVERTER <300,000	CT	1.04115	0.75910	1.80025	25.17	0.15049	0.10613	0.15049	113	7.35800	832.10000	3.47800	
FLASH TANK 24 GAL	CT	1.04115	0.75910	1.80025	25.17	0.15049	0.10613	0.15049	113	7.35800	171.34000	3.47800	
STORAGE TANK 24 GAL	CT	1.04115	0.75910	1.80025	25.17	0.15049	0.10613	0.15049	113	7.35800	340.62000	1.79698	
IND. FURN GAS/OIL 500 MBTU	CT	26.20723	2.59753	28.80476	586.67	3.66401	0.00000	3.66401	126	65.00000	1780.00000	16.25000	
IND. FURN GAS/OIL 2000 MBTU	CT	47.11381	0.00000	47.11381	1068.54	6.58495	0.00000	6.58495	126	184.60000	13780.00000	46.15000	
SURGE TANK 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	5.20000	1574.10000	2.60000	
DIST. PIPING SYSTEM	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	10.74450	41.34000	5.37225	
PIPE/FITTINGS, ST. & C.I.	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	113	5.55150	51.00720	2.77550	
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	24.1.00000	8034.80000	120.90000	
PIPE AND FITTINGS, PVC	TF	0.03272	0.20111	0.23383	0.94	0.00437	0.02812	0.03249	126	91.00000	954.00000	91.00000	
PIPE INSULATION	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.26000	17.91400	0.26000	
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.57200	94.05380	0.57200	
GATE VALVE, 2" - 3"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.68900	17.91400	0.68900	
GATE VALVE	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.57200	20.22480	0.57200	
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000	
PRESSURE REDUCER VALVE 2"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	38	1.30000	75.70520	1.30000	
STEAM TRAP F & T, <1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	113	91.00000	954.00000	91.00000	
PIPE INSULATION	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	4.19900	371.00000	4.19900	
CIRCULATION PUMP, < 1 HP	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	4.19900	1272.00000	2.09950	
CIRCULATION PUMP 5 HP	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	4.19900	1908.00000	7.80000	
COND. REVR. 10 - 15 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	4.19900	1908.00000	7.80000	
COOLING GENERATION EQUIPMENT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	4.19900	1908.00000	7.80000	
A/C DX PACKAGE 5T	CT	33.65919	1129.17677	33.06511	1890.67	3.56789	0.00000	3.56789	18	8.38500	1855.00000	4.19250	
REPAIR AIR CONDITIONER	CT	74.55406	4140.50873	72.62600	5825.23	9.04714	0.00000	9.04714	18	20.41000	2502.23000	20.80000	
A/C DX PACKAGE 20T	CT	97.51973	12112.71267	92.44935	14308.24	11.59564	0.00000	11.59564	18	27.71000	9018.53000	6.80333	
REPAIR AIR CONDITIONER	CT	16.81004	253.15370	16.81004	589.05	0.09515	0.12926	0.09515	9	13.00000	21200.00000	11.92750	
A/C WINDOW 1T	CT	15.05732	324.04450	15.05732	495.55	0.09515	0.12926	0.09515	9	13.00000	21200.00000	11.92750	
A/C WINDOW 2T	CT	36.75460	710.86910	35.21012	1539.26	0.09515	0.12926	0.09515	9	13.00000	21200.00000	11.92750	
A/C PAD MTD. 4T	CT	75.91722	4291.91965	75.91722	6013.72	9.23500	0.00000	9.23500	75	20.80000	2968.00000	6.50000	
A/C PAD MOUNTED 20 TON	CT	168.37500	3235.58746	83.17434	6781.69	22.04445	0.00000	22.04445	18	28.60000	9018.53000	6.80333	
REPAIR AIR CONDITIONER	CT	209.87646	3511.84500	102.14205	10927.09	28.54430	0.00000	28.54430	18	19.89000	10759.00000	7.15000	
REPAIR HERMETIC CHILLER	CT	214.48171	15502.74380	102.60909	20009.20	27.39628	532.42303	14.08041	18	40.30000	19080.00000	10.07500	
CHILLER AIR COOL REC.50T	CT	93.61954	1195.24328	92.14586	3313.82	11.85049	0.00000	11.85049	18	15.60000	3710.00000	6.14250	
REPAIR HERMETIC CHILLER	CT	134.19995	2197.77432	66.60875	5025.14	17.20232	0.00000	17.20232	18	20.80000	2003.40000	19.89000	
CHILLER AIR COOL REC. 10T	CT	171.76189	4202.20146	84.86779	7819.70	22.29930	0.00000	22.29930	18	24.57000	3879.60000	12.28500	
REPAIR HERMETIC CHILLER	CT	167.25393	2948.78602	82.56776	6471.11	22.29930	0.00000	22.29930	18	24.57000	9048.30000	12.28500	
CHILLER AIR COOL REC. 15T	CT	167.25393	2948.78602	82.56776	6471.11	22.29930	0.00000	22.29930	18	24.57000	9048.30000	12.28500	
REPAIR HERMETIC CHILLER	CT	167.25393	2948.78602	82.56776	6471.11	22.29930	0.00000	22.29930	18	24.57000	9048.30000	12.28500	

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
	By Resources				Annual Maintenance and Repair			
	Unit	Labor	material	equipment	Labor	material	equipment	Replacement and High Costs Tasks
Zone: 1								
REPAIR HERMETIC CHILLER	CT	172.35274	6008.10120	83.46593	22.29930	0.00000	11.14965	5.26500
CHILLER WAT. COOL. REC. 50T	CT	176.03694	13536.65580	83.88373	22.29930	0.00000	11.14965	12.02500
REPAIR HERMETIC CHILLER	CT	147.73612	1886.61640	73.13122	19.75081	0.00000	9.87540	6.02333
CHILLER WAT. COOL. REC. 10T	CT	176.03694	22246.98320	83.88373	22.29930	0.00000	11.14965	18.32500
REPAIR HERMETIC CHILLER	CT	246.85795	12817.72818	121.21845	32.49327	0.00000	16.24663	4.51750
CHILLER WAT. COOL. REC. 200T	CT	251.65784	31000.40140	122.37498	32.49327	0.00000	16.24663	5.26500
REPAIR HERMETIC CHILLER	CT	261.04212	84624.67876	124.76450	32.49327	0.00000	16.24663	18.52500
CHILL. HERMETIC CENT. 100T	CT	629.33584	31000.40140	311.21398	84.73734	0.00000	42.36867	15.40000
REPAIR CHILLER	CT	261.04212	84624.67876	124.76450	32.49327	0.00000	16.24663	18.52500
CHILL. HERMETIC CENT. 300T	CT	284.23568	13409.46788	139.67706	37.59025	0.00000	18.79512	24.37500
REPAIR CHILLER	CT	295.32307	41584.52525	143.83918	37.59025	0.00000	18.79512	40.62500
CHILL. OPEN CENT. 300T	CT	316.02846	86586.51616	151.73504	111.49650	0.00000	55.74825	3.38500
REPAIR CHILLER	CT	809.56781	7807.68440	402.48128	16.43777	0.00000	8.21888	17.22500
CHILL. DBL. BMOL. HERM. 100T	CT	135.17703	11262.33040	63.90431	16.43777	0.00000	8.21888	26.97500
REPAIR CHILLER	CT	144.20332	18622.22840	66.16089	16.43777	0.00000	8.21888	44.52500
CHILL. DBL. BMOL. HERM. 300T	CT	136.65071	12163.54240	64.27273	15.69184	0.00000	7.84592	32.89000
REPAIR CHILLER	CT	138.39530	20379.59180	62.65819	15.69184	0.00000	7.84592	16.25000
CHILL. TWO STG. ABS. 900T	CT	20.84408	364.44027	19.93946	2.65579	0.00000	1.32790	26.00000
AIR COOLED CONDENSER 5T	CT	23.31183	74.28483	10.93458	2.65579	0.00000	1.32790	41.50000
REPAIR CHILLER	CT	26.10992	1171.34900	17.33640	4.73300	0.00000	2.51150	6.83333
AIR COOLED CONDENSER 50T	CT	41.34692	3201.56440	18.23577	4.73300	0.00000	2.51150	7.50000
REPAIR CHILLER	CT	43.30665	1439.92276	19.32557	4.73300	0.00000	2.51150	11.70000
CHILLING TOWER 50T	CT	111.39751	2500.13901	53.09125	14.06387	0.00000	7.03193	13.00000
COOLING TOWER 100T	CT	133.04404	4439.32387	62.47577	14.06387	0.00000	7.03193	15.00000
REPAIR CHILLER	CT	153.49578	10013.06337	52.07158	17.72850	0.00000	8.86325	19.50000
CHILLING TOWER 300T	CT	70.38574	1100.85123	33.30462	8.78460	0.00000	4.39230	32.17500
EVAPORATIVE CONDENSER 20T	CT	120.62088	2826.11847	55.11775	13.93998	0.00000	6.97999	35.10000
REPAIR CHILLER	CT	64.48322	7556.10660	22.80036	3.73546	0.00000	1.86773	100.80000
EXPANSION TANK	CT	0.00502	0.00000	0.00502	0.00070	0.00000	0.00070	135.60000
REFRIG. FAN COIL 1T	CT	5.71245	199.87625	5.44270	0.72323	0.00000	0.72323	135.60000
REFRIG. FAN COIL 3T	CT	5.76640	257.57522	5.46967	0.72323	0.00000	0.72323	135.60000
REFRIG. FAN COIL 5T	CT	5.84732	340.13492	5.51013	0.72323	0.00000	0.72323	135.60000
DIST. PIPING SYSTEM	TF	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.37225
PIPE/FITTINGS ST. & C.I.	TF	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.37225
PIPE/FITTINGS COPPER	TF	24.53284	811.01475	12.82972	0.15751	0.00000	0.15751	120.00000
PIPE AND FITTINGS, PVC	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.68900
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.57200
GATE VALVE, 2" - 3"	CT	0.12035	0.11323	0.12035	0.01683	0.01583	0.01683	0.57200
DRAIN VALVE	TF	0.04353	0.25394	0.04353	0.00609	0.03550	0.00609	91.00000
PIPE INSULATION	CT	0.85658	2.16240	0.85658	0.11976	0.30232	0.11976	4.19900
CIRCULATOR PUMP, < 1 HP	CT	0.85658	2.16240	0.85658	0.11976	0.30232	0.11976	4.19900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	Zone: 1	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Annual Maintenance and Repair									
		Washington					Replacement and High Costs Tasks									
		labor	material	equipment	D.C. Total	Washington	labor	material	equipment	yr	labor	material	equipment			
5 TON CHILLER ACH RECIP	CT	0.85876	6.45211	0.85876	25.93	2967.36	7.03466	0.90206	4.46404	57	15.60000	1272.00000	7.80000			
HEAT/COOL GENERATION EQUIPMENT																
MULTI-ZONE 6500 CFM	CT	57.86910	1731.05652	33.81777	3528.83	3528.83	7.03466	68.14018	4.46404	13	36.40000	5997.48000	9.10000			
MULTI-ZONE 10,000 CFM	CT	59.21785	2265.97096	34.15465	3731.58	3731.58	7.03466	83.24955	4.46404	13	42.90000	8050.70000	10.75000			
MULTI-ZONE 25,000 CFM	CT	68.67019	4270.87729	38.43971	8550.79	8550.79	7.03466	151.53357	4.46404	13	105.30000	15359.40000	18.85000			
MULTI-ZONE 50,000 CFM	CT	77.58303	6902.83666	42.68936	12650.26	12650.26	7.03466	172.93349	4.46404	13	126.00000	27305.60000	26.32500			
DUAL DUCT 6500 CFM	CT	55.71110	1258.51917	33.27827	2648.33	2648.33	6.90843	52.94846	4.40093	13	26.00000	5240.00000	6.50000			
DUAL DUCT 10,000 CFM	CT	58.37468	1731.05652	33.27827	3518.39	3518.39	6.90843	68.14018	4.40093	13	26.00000	5997.48000	9.10000			
DUAL DUCT 25,000 CFM	CT	67.76732	4236.74262	37.08828	8531.76	8531.76	6.90843	83.24955	4.40093	13	32.50000	8050.70000	10.75000			
DUAL DUCT 50,000 CFM	CT	76.68916	6902.83666	42.24793	12650.26	12650.26	6.90843	151.53357	4.40093	13	32.50000	15359.40000	18.85000			
3 DK.MULTI ZONE 6500 CFM	CT	57.05783	1731.05652	33.61546	3529.42	3529.42	7.03466	68.14018	4.46404	13	36.40000	5997.48000	9.10000			
3 DK.MULTI ZONE 10,000 CFM	CT	59.21785	2265.97096	34.15465	3731.58	3731.58	7.03466	83.24955	4.46404	13	42.90000	8050.70000	10.75000			
3 DK.MULTI ZONE 25,000 CFM	CT	68.67019	4270.87729	38.43971	8550.79	8550.79	7.03466	151.53357	4.46404	13	105.30000	15359.40000	18.85000			
3 DK.MULTI ZONE 50,000 CFM	CT	77.58303	6902.83666	42.68936	12650.26	12650.26	7.03466	172.93349	4.46404	13	126.00000	27305.60000	26.32500			
D.D. VARI. VOL. 6500 CFM	CT	57.50573	1851.06912	26.72974	3056.82	3056.82	6.90843	52.94846	4.40093	13	26.00000	5240.00000	6.50000			
D.D. VARI. VOL. 10,000 CFM	CT	59.12423	2443.61948	27.13437	3682.19	3682.19	6.90843	68.14018	4.40093	13	26.00000	5997.48000	9.10000			
D.D. VARI. VOL. 25,000 CFM	CT	69.38582	4585.44798	30.37691	6034.29	6034.29	6.90843	149.07138	4.40093	13	32.50000	8050.70000	10.75000			
D.D. VARI. VOL. 50,000 CFM	CT	78.83816	7369.72832	33.47174	9012.43	9012.43	6.90843	169.37200	4.40093	13	32.50000	15359.40000	18.85000			
D.D. VARI. VOL. 100,000CFM	CT	89.89791	12160.71833	36.01742	14027.19	14027.19	6.90843	285.63299	4.40093	13	32.50000	27305.60000	26.32500			
VARIABLE VOLUME 6500 CFM	CT	56.15698	1731.05652	30.76966	2968.26	2968.26	6.90843	68.14018	4.40093	13	26.00000	5240.00000	6.50000			
VARIABLE VOLUME 10,000 CFM	CT	58.31498	2265.97096	32.70353	3510.39	3510.39	6.90843	83.24955	4.40093	13	26.00000	5997.48000	9.10000			
VARIABLE VOLUME 25,000 CFM	CT	68.67019	4270.87729	38.43971	8550.79	8550.79	6.90843	151.53357	4.40093	13	32.50000	8050.70000	10.75000			
VARIABLE VOLUME 50,000 CFM	CT	77.58303	6902.83666	42.68936	12650.26	12650.26	6.90843	172.93349	4.40093	13	32.50000	15359.40000	18.85000			
TERM. REHEAT 6500 CFM	CT	50.21125	492.51087	32.07941	1573.28	1573.28	7.02000	84.50320	4.48500	63	32.50000	4279.22000	8.42500			
TERM. REHEAT 10,000 CFM	CT	50.21125	644.41759	32.07941	1685.19	1685.19	7.02000	84.50320	4.48500	63	32.50000	4279.22000	8.42500			
TERM. REHEAT 25,000 CFM	CT	53.00028	1078.58041	34.84893	2222.62	2222.62	7.02000	171.65460	4.48500	63	32.50000	15274.60000	17.87500			
TERM. REHEAT 50,000 CFM	CT	55.70028	1227.78957	37.65844	2532.09	2532.09	7.02000	171.65460	4.48500	63	32.50000	22853.60000	28.27500			
2 PIPE INDUCTION 6500 CFM	CT	50.21125	604.41759	32.07941	1685.19	1685.19	7.02000	84.50320	4.48500	63	32.50000	4279.22000	8.42500			
2 PIPE INDUCTION 10,000 CFM	CT	50.21125	1078.58041	34.84893	2222.62	2222.62	7.02000	171.65460	4.48500	63	32.50000	15274.60000	17.87500			
2 PIPE INDUCTION 25,000 CFM	CT	53.00028	1227.78957	37.65844	2532.09	2532.09	7.02000	171.65460	4.48500	63	32.50000	22853.60000	28.27500			
2 PIPE INDUCTION 50,000 CFM	CT	55.70028	1227.78957	37.65844	2532.09	2532.09	7.02000	171.65460	4.48500	63	32.50000	22853.60000	28.27500			
4 PIPE INDUCTION 6500 CFM	CT	57.23595	1851.06912	26.72974	3056.82	3056.82	6.90843	52.94846	4.40093	13	26.00000	5240.00000	6.50000			
4 PIPE INDUCTION 10,000 CFM	CT	59.12423	2443.61948	27.13437	3682.19	3682.19	6.90843	68.14018	4.40093	13	26.00000	5997.48000	9.10000			
4 PIPE INDUCTION 25,000 CFM	CT	69.38582	4585.44798	30.37691	6034.29	6034.29	6.90843	149.07138	4.40093	13	32.50000	8050.70000	10.75000			
4 PIPE INDUCTION 50,000 CFM	CT	78.83816	7369.72832	33.47174	9012.43	9012.43	6.90843	169.37200	4.40093	13	32.50000	15359.40000	18.85000			
2 PIPE FAN COIL 200 CFM	CT	8.42104	193.01869	8.15129	383.14	383.14	1.10191	9.30395	1.10191	13	2.60000	699.50000	1.30000			
2 PIPE FAN COIL 400 CFM	CT	8.42104	210.61489	8.15129	400.74	400.74	1.10191	9.30395	1.10191	13	2.60000	699.50000	1.30000			
2 PIPE FAN COIL 600 CFM	CT	8.47499	222.71194	8.17826	413.98	413.98	1.10191	9.30395	1.10191	13	2.60000	699.50000	1.30000			
2 PIPE FAN COIL 1200 CFM	CT	8.55591	323.86894	8.21872	516.86	516.86	1.10191	9.30395	1.10191	13	2.60000	699.50000	1.30000			
4 PIPE FAN COIL 200 CFM	CT	8.47499	204.45609	8.17826	395.72	395.72	1.10191	9.30395	1.10191	13	2.60000	664.62000	1.43000			
4 PIPE FAN COIL 400 CFM	CT	8.47499	383.27544	8.17826	574.54	574.54	1.10191	9.30395	1.10191	13	2.60000	664.62000	1.43000			
4 PIPE FAN COIL 600 CFM	CT	8.52894	238.32839	8.20524	430.73	430.73	1.10191	9.30395	1.10191	13	2.60000	664.62000	1.43000			
4 PIPE FAN COIL 1200 CFM	CT	8.53684	349.62309	8.25919	544.30	544.30	1.10191	9.30395	1.10191	13	2.60000	664.62000	1.43000			
UNIT VENT 400 CFM	CT	13.61867	363.34431	13.34892	671.35	671.35	1.82859	4.67233	1.82859	13	3.64000	1364.22000	1.82000			
UNIT VENT 1200 CFM	CT	13.61867	429.32931	13.34892	740.18	740.18	1.82859	4.67233	1.82859	13	3.64000	1364.22000	1.82000			
SIN-ZONE DRAW THRU 6500CFM	CT	56.15698	1375.31757	33.16403	2575.38	2575.38	6.90843	68.14018	4.40093	13	32.50000	1908.00000	1.30000			
SIN-ZONE DRAW THRU 10,000CFM	CT	57.50573	1678.78008	33.43378	3100.73	3100.73	6.90843	83.24955	4.40093	13	32.50000	4279.22000	8.42500			
SIN-ZONE DRAW THRU 25,000CFM	CT	68.67019	4239.14662	37.89574	5664.76	5664.76	6.90843	149.07138	4.40093	13	32.50000	15274.60000	17.87500			
SIN-ZONE DRAW THRU 50,000CFM	CT	77.58303	6979.04606	42.76233	12611.45	12611.45	6.90843	172.93349	4.40093	13	32.50000	22853.60000	28.27500			
SIN-ZONE DRAWTHRU 1000CFM	CT	54.24873	1148.54417	30.95366	2310.31	2310.31	6.90843	52.94846	4.40093	13	23.00000	3716.00000	5.85000			
SIN-ZONE DRAWTHRU 2500CFM	CT	54.24873	98.30456	13.34892	406.31	406.31	6.90843	52.94846	4.40093	13	23.00000	3716.00000	5.85000			
UNIT HEATER 400 CFM	CT	13.61867	129.09756	13.41636	439.95	439.95	1.82859	4.67233	1.82859	13	2.60000	312.70000	1.30000			
UNIT HEATER 1200 CFM	CT	13.61867	274.74755	13.41636	929.95	929.95	1.82859	4.67233	1.82859	13	2.60000	312.70000	1.30000			
UNIT HEATER 4000 CFM	CT	13.61867	342.11231	13.41636	652.40	652.40	1.82859	10.92926	1.82859	13	2.60000	312.70000	1.30000			
UNIT HEATER 8000 CFM	CT	13.61867	95.37900	9.20828	308.52	308.52	1.82859	0.00000	1.82859	13	2.60000	312.70000	1.30000			

See NOTES on page 150MBH GASIFIED RADIANT HTR

last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE	20
Zone: 1	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢/10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks					
		Washington				Annual Maintenance and Repair				Replacement and High Costs Tasks					
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment			
HEAT PUMP 5T	CT	34,52811	2029,24871	33,93403	2810.45	4,66124	224,36387	4,66124	18	8,38500	2994,50000	4,19250			
HEAT PUMP 10T	CT	74,55720	3485,84104	73,20632	5572.52	10,14049	424,63436	10,14049	18	14,30000	5089,00000	4,76667			
HEAT PUMP 25T	CT	93,22339	10433,49116	91,43001	12567.95	12,68898	1109,75137	12,68898	18	19,50000	17755,00000	4,87500			
HEAT PUMP 1T	CT	32,21307	269,10044	31,83070	997.46	4,39197	12,28337	4,39197	18	5,53800	1272,00000	2,76500			
DUCT/COIL 1-ROW H.M.12X24	CT	18,57159	7,79621	9,28580	399.29	2,56481	0,00000	1,28241	22	2,34000	80,56000	1,17000			
VENTILATION SYSTEM															
FIXTURES															
FORCE DRAFT FAN 10,000 CFM	CT	31,61449	156,79071	31,61449	873.81	4,42000	21,92080	4,42000	84	26,00000	2851,40000	6,50000			
IND DRAFT FAN 10000 CFM	CT	31,61449	156,79071	31,61449	873.81	4,42000	21,92080	4,42000	84	26,00000	2929,84000	6,50000			
EXHAUST SYSTEM															
EQUIPMENT															
EXHAUST FAN <200 CFM	CT	0,50219	0,00000	0,50219	11.39	0,07021	0,00000	0,07021	75	3,35000	41,58380	3,25000			
EXHAUST FAN 1000 CFM	CT	10,07102	41,34397	9,76656	268.78	1,32289	0,92116	1,32289	20	3,20000	296,80000	2,80000			
EXHAUST FAN 10,000 CFM	CT	31,61449	156,79071	31,61449	873.81	4,42000	21,92080	4,42000	75	26,00000	1805,18000	6,50000			
EXHAUST FAN 25,000 CFM	CT	31,61449	156,79071	31,61449	873.81	4,42000	21,92080	4,42000	75	26,00000	1805,18000	6,50000			
EXHAUST FAN 50,000 CFM	CT	31,61449	156,79071	31,61449	873.81	4,42000	21,92080	4,42000	75	26,00000	1805,18000	6,50000			
EXHAUST FAN 1000 CFM	CT	11,75915	238,53908	10,43666	501.02	1,33499	1,01334	1,30462	18	15,60000	5406,00000	8,12500			
EXHAUST FAN 5000 CFM	CT	3,06277	116,98690	3,06277	186.45	0,36362	2,70609	0,36362	18	3,25000	1632,40000	7,80000			
AIR CURTAIN, 1000 CFM	CT	3,06277	116,98690	3,06277	186.45	0,36362	2,70609	0,36362	18	3,25000	1632,40000	7,80000			
FIXTURES															
METAL FLUE/CHIMNEY	LF	0,00000	0,00000	0,00000	0.00	0,00000	0,00000	0,00000	63	9,10000	124,02000	4,55000			
SPECIAL SYSTEM															
HUMIDITY CONTROL SYSTEM	CT	4,69942	0,61438	4,69942	107.20	0,65702	0,08590	0,65702	38	0,13000	84,80000	0,13000			
ROOM HUMIDIFIER, FLOOR TYPE															
CONTROLS/INSTRUMENT															
DEVICES															
THERMOSTATS/PNEUMATICS	CT	9,23719	21,92438	9,23719	231.43	1,27872	0,00000	1,27872	20	0,78000	167,22780	0,78000			
HUMIDITY SENSOR	CT	0,05091	27,71830	0,05091	252.99	0,00000	0,00000	0,00000	9	1,56000	200,53080	1,56000			
FLOW SENSOR	CT	9,19048	20,73888	9,19048	229.20	1,26239	0,00000	1,26239	13	0,78000	100,04280	0,78000			
RADIATION SENSOR	CT	9,22470	0,42720	9,22470	230.14	1,27425	0,00000	1,27425	18	0,78000	77,11500	0,78000			
WIND VELOCITY SENSOR	CT	9,05091	21,66630	9,05091	234.94	0,00000	0,00000	0,00000	9	1,56000	91,05100	1,56000			
PRESSURE SENSOR	CT	9,22470	8,26111	9,22470	217.48	1,27425	0,00000	1,27425	18	0,78000	58,39000	0,78000			
DAMPER CONTROLLER/ELECT.	CT	9,56813	59,39545	9,56813	276.69	1,56239	0,00000	1,56239	13	2,40000	287,20700	2,40000			
SIMPLEX AIR COMP. 1 HP	CT	30,79386	621,12977	20,57944	1286.83	4,23329	4,23329	2,85320	22	3,67900	6103,62980	1,83950			

See NOTES on the last page of this table for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 21

COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources			Annual Maintenance and Repair					Replacement and High Costs Tasks				
		Labor	Material	Equipment	Washington	D.C. Total	Labor	Material	Equipment	Yr	Labor	Material	Equipment	
Zone: 2														
HVAC														
NATURAL GAS SYSTEM														
EQUIPMENT														
GAS METER	CT	0.06689	16.90647	0.06689	18.42		0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	0.39000
PIPING SYSTEM	TF	0.94552	1.69770	0.47276	21.63		0.13219	0.23735	0.06610	141	1074.4500	1929.20000	537.22500	537.22500
PIPE/FITTINGS, STEEL/IRON	CT	0.15230	0.00000	0.15230	3.45		0.02129	0.00000	0.02129	26	0.30000	19.08000	0.26000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.15230	0.00000	0.15230	3.45		0.02129	0.00000	0.02129	26	0.62400	323.30000	0.31200	0.31200
FUEL OIL SYSTEM														
STORAGE SYSTEMS														
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	56	2.60000	164.30000	1.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13		0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35		0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000	1.30000
DISTRIBUTION SYSTEM	TF	0.02378	0.01092	0.02378	0.55		0.00332	0.00153	0.00332	47	55.51000	1113.00000	27.75500	27.75500
PIPE/FITTINGS, COPPER														
LPG SYSTEM														
STORAGE SYSTEM														
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	56	5.20000	1574.10000	2.60000	2.60000
DISTRIBUTION SYSTEM	TF	0.94552	1.69770	0.47276	21.63		0.13219	0.23735	0.06610	141	1074.4500	1929.20000	537.22500	537.22500
PIPE/FITTINGS, STEEL/IRON														
STEAM, CENTRAL														
PRESS. RED. REG. SYSTEM	CT	3.51303	3.31692	3.51303	82.99		0.49115	0.46376	0.49115	49	7.35800	832.10000	3.67900	3.67900
STEAM CONVERTOR, <300,000	CT	3.64035	13.60007	3.42408	95.86		0.44568	0.40383	0.44568	24	7.30000	147.34000	3.25000	3.25000
FLASH TANK, 24 GAL.	CT	3.28302	105.44850	1.64151	174.65		0.00000	0.00000	0.00000	10	7.80000	230.50000	3.90000	3.90000
STEAM REG. VALVE 2"	CT	4.38269	0.00000	4.38269	99.40		0.61274	0.00000	0.61274	56	0.65000	1007.00000	0.65000	0.65000
COND. METER, <300 #/HR.														
VALVES														
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	81	1.43000	20.22480	0.71500	0.71500
EQUIPMENT														
CAST IRON RADIATOR, 10 SECT	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	81	5.20000	175.96000	2.60000	2.60000
BASEBOARD RADIATOR, 10 FT	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	32	5.20000	232.14000	2.60000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	32	5.20000	262.35000	2.60000	2.60000
SOLAR														
EQUIPMENT														
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	28	3.90000	349.80000	1.95000	1.95000
SOLAR STORAGE TANK, 1000GAL	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	38	15.60000	2194.20000	7.80000	7.80000
PIPING SYSTEM	TF	0.20568	1.06235	0.17317	5.62		0.02876	0.14853	0.02421	25	41.70530	669.12500	20.85265	20.85265
PIPE/FITTINGS, PVC														
HEATING GENERATION														
EQUIPMENT														
BOILER GAS 250 KBTU/HR	CT	272.72736	108.20403	272.72736	6293.66		38.12982	15.12793	38.12982	49	65.00000	3169.40000	32.50000	32.50000
BOILER GAS 2000 KBTU/HR	CT	305.81754	209.08255	305.81754	7145.02		42.75614	29.23168	42.75614	49	184.60000	15032.92000	46.15000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	315.24446	1235.23977	315.24446	8384.98		44.07411	172.69801	44.07411	49	248.60000	38160.00000	62.17250	62.17250
BOILER COAL 40,000 KBTU/HR	CT	743.77124	0.00000	499.68976	16087.67		103.96614	0.00000	69.86114	49	20000.000	636000.00000	4160.0000	4160.0000
BOILER COAL 100,000 KBTU/HR	CT	895.33483	0.00000	575.47056	19282.63		125.17614	0.00000	80.45614	49	41600.000	1590000.00000	8320.0000	8320.0000
BOILER OIL 250 KBTU/HR	CT	308.67065	75.45131	308.67065	7076.10		43.15503	10.54879	43.15503	49	65.00000	3169.40000	16.25000	16.25000
BOILER OIL 2000 KBTU/HR	CT	346.40954	75.45131	346.40954	7932.02		48.43128	10.54879	48.43128	49	184.60000	15032.92000	46.15000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	381.74339	84.14990	381.74339	8742.09		53.37128	11.76494	53.37128	49	248.60000	38160.00000	62.17250	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	315.32405	129.54074	315.32405	7281.09		44.08523	18.11100	44.08523	49	184.60000	15032.92000	46.15000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	329.40387	2333.69366	329.40387	9804.77		46.03572	326.30004	46.03572	49	651.30000	71020.00000	162.83500	162.83500
BOILER-PNEUMAT. COAL SPREAD.	CT	1450.0657	903.26999	1432.6122	3374.91		199.75304	34.30951	199.75304	49	181.00000	5018.00000	45.50000	45.50000
ASH HANDLING SYSTEM	CT	2310.4328	280.43604	2309.6830	52678.65		323.02001	39.20757	322.91517	32	10400.000	212000.00000	2600.0000	2600.0000
FUEL OIL EQUIPMENT	CT	4.58590	22.78894	4.58590	119.46		0.61474	0.11552	0.61474	24	3.25000	302.10000	1.30000	1.30000
CHEMICAL FEED SYSTEM	CT	4.83421	28.28175	4.83421	137.63		0.00000	0.00000	0.00000	24	3.25000	302.10000	1.30000	1.30000
FEED-WATER SUPPLY	CT	140.13727	200.36120	138.75112	3374.24		19.30180	0.00000	19.30180	24	28.60000	21200.00000	9.53333	9.53333
DEAERATOR	CT	139.57704	28.28175	137.63	2942.78		19.51617	0.00000	19.51617	24	28.60000	21200.00000	9.53333	9.53333
BLOWOFF SYSTEM	CT	0.18902	10.71162	0.09451	14.70		0.00000	0.00000	0.00000	24	10.40000	355.10000	5.20000	5.20000
HOUSE FURN. GAS 25KBTU/HR	CT	29.80691	74.56570	29.42887	749.38		4.06158	6.81569	4.06158	24	10.40000	355.10000	5.20000	5.20000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (P-10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		Labor	material	equipment	D.C. Total	Labor	material	equipment	Yr
HOUSE FURN. GAS 100KBTU/HR	CT	30.57110	92.62725	29.81502	783.56	4.06271	8.15573	4.06271	24
HOUSE FURN. GAS 200KBTU/HR	CT	30.57110	200.90469	29.81502	891.84	4.06271	9.93474	4.06271	24
HOUSE FURN. OIL 100KBTU/HR	CT	30.57110	130.89103	38.64085	1014.63	5.34950	9.68060	5.34950	24
HOUSE FURN. OIL 200KBTU/HR	CT	39.77497	174.28374	39.01889	1073.96	5.34950	10.53855	5.34950	24
HOUSE FURN. ELECT. 25KBTU/HR	CT	39.77497	204.39920	39.01889	1104.07	2.02369	12.34081	2.02369	24
HOUSE FURN. ELECT. 200KBTU/HR	CT	15.23070	16.71482	15.23070	420.97	2.02369	6.62081	2.02369	24
HOUSE FURN. ELECT. 200KBTU/H	CT	15.23070	102.21084	15.23070	420.97	2.02369	6.62081	2.02369	24
CAST IRON RADIATOR 10 FT	CT	15.98678	130.45978	15.23070	490.26	2.02369	8.54850	2.02369	24
FINISHED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	24
EXPANSION TANK	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	24
STEAM CONVERTOR, <300,000	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	24
FLASH TANK, 24 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	24
STORAGE TANK, DMV	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	24
IND. FURN. GAS/OIL 500 MBU	CT	0.02195	3.65477	0.02195	86.21	0.00307	0.00307	0.00307	24
IND. FURN. GAS/OIL 2000 MBTU	CT	3.66035	13.60007	3.66035	95.86	0.45058	0.45058	0.45058	24
SURGE TANK, 1000 GAL	CT	27.94061	8.18956	5.76817	139.01	3.80644	16.94498	3.80644	24
DIST. PIPING SYSTEM	TF	0.02363	0.01233	0.02363	0.55	0.00330	0.00172	0.00330	81
PIPE/FITTINGS, ST. & C.I.	TF	0.02878	0.01322	0.02878	0.67	0.00402	0.00185	0.00402	49
PIPE/FITTINGS, COPPER	TF	0.10549	0.52427	0.10549	2.92	0.01475	0.07330	0.01475	24
PIPE AND FITTINGS, PVC	TF	0.14622	0.89677	0.14622	4.22	0.02044	0.12566	0.02044	56
PIPE INSULATION	CT	0.23571	0.06941	0.23571	5.42	0.03295	0.00970	0.03295	32
GATE VALVE, 3/8" - 1 1/2"	CT	0.05533	1.3861	0.05533	11.44	0.00774	0.01941	0.00774	32
GATE VALVE, 2" - 3"	CT	0.42853	1.72215	0.42853	11.44	0.05991	0.24077	0.05991	32
DRAIN VALVE	CT	0.10394	1.47034	0.10394	3.66	0.00000	0.00000	0.00000	24
RADIATOR VALVE 1"	CT	3.28302	105.44850	1.64151	174.65	0.00000	0.00000	0.00000	24
PRESSURE REDUCER VALVE 2"	CT	0.19023	30.23099	5.34920	151.55	0.01953	0.16348	0.01953	16
STEAM TRAP F & T, <1"	TF	0.19023	1.69297	0.19023	5.48	0.02660	0.02660	0.02660	24
PIPE INSULATION	CT	1.37402	29.45023	1.37402	60.81	0.14942	0.37448	0.14942	24
CIRCULATION PUMP, <1 HP	CT	1.37402	111.47581	1.22139	142.15	0.14942	0.37448	0.14942	24
COND. RCVR. 10 - 15 GAL.	CT	12.06211	38.31281	12.06211	311.88	1.68640	5.35649	1.68640	32
COOLING GENERATION	CT	32.91014	1004.73997	32.41920	1749.57	3.58041	0.00000	3.58041	19
A/C DX PACKAGE 5T	CT	73.64672	3670.77533	72.05338	5335.98	9.07889	0.00000	9.07889	19
REPAIR AIR CONDITIONER	CT	95.92573	10762.63597	91.73560	12924.82	11.63632	0.00000	11.63632	19
A/C DX PACKAGE 20T	CT	14.55565	223.07856	14.55565	554.10	0.09257	0.12605	0.09257	10
REPAIR AIR CONDITIONER	CT	14.74531	313.20936	14.74531	648.30	0.09257	0.12605	0.09257	10
A/C WINDOW 1T	CT	36.65254	629.12341	35.28461	1456.33	0.09257	0.3023	0.09257	10
A/C WINDOW 2T	CT	74.77322	3795.90054	74.77322	5491.76	9.23000	0.00000	9.23000	32
A/C PAD MTD. 4T	CT	167.62004	2815.27414	82.97275	6346.03	22.12180	0.00000	11.06090	19
REPAIR AIR CONDITIONER	CT	208.82572	5096.06900	101.98902	10090.36	28.53600	483.99197	16.09407	19
CHILLER AIR COOL REC.50T	CT	212.63147	13520.86220	102.31842	16090.34	27.49241	0.00000	13.74621	19
CHILLER AIR COOL REC.100T	CT	92.92854	1043.07392	91.71070	3146.80	11.89207	0.00000	11.89207	19
REPAIR HERMETIC CHILLER	CT	133.37307	1923.37848	66.28059	4733.58	17.26268	0.00000	8.63134	19
CHILLER AIR COOL REC. 5T	CT	170.87105	3723.13234	84.59226	7322.41	22.37754	0.00000	11.18877	19
REPAIR HERMETIC CHILLER	CT	166.75793	2568.83622	82.50364	6081.29	22.37754	0.00000	11.18877	19
CHILLER WAT. COOL REC.20T	CT								

See notes on the last page of this table for Explanation of Column Headings



Zone: 2	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		Labor	Material	Equipment	D.C. Total	Labor	Material	Labor	Material
CT	5 TON CHILLER ACH RECIP EQUIPMENT	2.20287	111.47581	1.63581	159.62	0.14942	2.65657	15.60000	1272.00000
CT	MULTI-ZONE 6500 CFM	58.49123	1855.36272	33.91928	3103.31	7.01579	67.96662	36.40000	5997.48000
CT	MULTI-ZONE 10,000 CFM	59.97518	2431.86049	34.29026	3709.91	7.01579	83.03074	42.90000	8050.70000
CT	MULTI-ZONE 25,000 CFM	70.09540	4537.64033	36.73362	6077.05	7.39334	151.14634	75.40000	15359.40000
CT	MULTI-ZONE 50,000 CFM	79.62205	7468.15489	43.14064	9157.24	7.77089	172.56472	105.70000	27305.60000
CT	MULTI-ZONE 2500 CFM	55.28354	1178.39775	33.20577	2361.58	7.04358	52.95050	26.00000	4240.00000
CT	DUAL DUCT 6500 CFM	57.59107	1855.36272	33.46920	3084.34	6.88993	67.96662	36.40000	5997.48000
CT	DUAL DUCT 10,000 CFM	59.07502	2432.44767	33.84018	3691.52	6.88993	83.11283	42.90000	8050.70000
CT	DUAL DUCT 25,000 CFM	69.19524	4573.54799	38.28354	6043.96	7.26749	149.17610	75.40000	15359.40000
CT	DUAL DUCT 50,000 CFM	78.72189	7468.15489	42.69056	9138.27	7.64504	172.56472	105.70000	27305.60000
CT	3 DK MULTI ZONE 6500 CFM	57.60086	1855.35358	33.69648	3085.25	7.01579	67.96534	37.50000	5997.48000
CT	3 DK MULTI ZONE 10,000 CFM	59.07518	2432.44767	34.29026	3710.49	7.01579	83.11283	42.90000	8050.70000
CT	3 DK MULTI ZONE 25,000 CFM	70.09540	4537.64033	43.14064	9157.24	7.39334	151.14634	75.40000	15359.40000
CT	3 DK MULTI ZONE 50,000 CFM	79.62205	7468.15489	43.14064	9157.24	7.77089	172.56472	105.70000	27305.60000
CT	D.D. VARI. VOL. 1000 CFM	58.18445	1866.53644	23.86440	3205.94	6.88993	67.96662	36.40000	5997.48000
CT	D.D. VARI. VOL. 2500 CFM	59.97518	2432.44767	33.84018	3691.52	6.88993	83.11283	42.90000	8050.70000
CT	D.D. VARI. VOL. 5000 CFM	69.19524	4573.54799	38.28354	6043.96	7.26749	149.17610	75.40000	15359.40000
CT	D.D. VARI. VOL. 10000 CFM	81.09621	7468.15489	42.69056	9138.27	7.64504	172.56472	105.70000	27305.60000
CT	VARIABLE VOLUME 6500 CFM	57.60086	1855.35358	33.69648	3085.25	7.01579	67.96534	37.50000	5997.48000
CT	VARIABLE VOLUME 10000 CFM	59.07518	2432.44767	34.29026	3710.49	7.01579	83.11283	42.90000	8050.70000
CT	VARIABLE VOLUME 25000 CFM	70.09540	4537.64033	43.14064	9157.24	7.39334	151.14634	75.40000	15359.40000
CT	VARIABLE VOLUME 50000 CFM	79.62205	7468.15489	43.14064	9157.24	7.77089	172.56472	105.70000	27305.60000
CT	TERM. REHEAT 6500 CFM	58.18445	1866.53644	23.86440	3205.94	6.88993	67.96662	36.40000	5997.48000
CT	TERM. REHEAT 10000 CFM	59.97518	2432.44767	33.84018	3691.52	6.88993	83.11283	42.90000	8050.70000
CT	TERM. REHEAT 25000 CFM	69.19524	4573.54799	38.28354	6043.96	7.26749	149.17610	75.40000	15359.40000
CT	TERM. REHEAT 50000 CFM	81.09621	7468.15489	42.69056	9138.27	7.64504	172.56472	105.70000	27305.60000
CT	2 PIPE INDUCTION 6500 CFM	53.20169	1085.40701	34.96939	2233.68	7.43809	67.96519	37.50000	5997.48000
CT	2 PIPE INDUCTION 10000 CFM	55.01678	1266.28994	37.75890	2452.98	7.82809	83.11283	42.90000	8050.70000
CT	2 PIPE INDUCTION 25000 CFM	59.97518	2432.44767	33.84018	3691.52	7.04809	99.24814	42.90000	8050.70000
CT	2 PIPE INDUCTION 50000 CFM	69.19524	4573.54799	38.28354	6043.96	7.43809	117.74999	75.40000	15359.40000
CT	4 PIPE INDUCTION 10000 CFM	55.01678	1266.28994	37.75890	2452.98	7.82809	83.11283	42.90000	8050.70000
CT	4 PIPE INDUCTION 25000 CFM	59.97518	2432.44767	33.84018	3691.52	7.04809	99.24814	42.90000	8050.70000
CT	4 PIPE INDUCTION 50000 CFM	69.19524	4573.54799	38.28354	6043.96	7.43809	117.74999	75.40000	15359.40000
CT	4 PIPE INDUCTION 10000 CFM	55.01678	1266.28994	37.75890	2452.98	7.82809	83.11283	42.90000	8050.70000
CT	4 PIPE INDUCTION 25000 CFM	59.97518	2432.44767	33.84018	3691.52	7.04809	99.24814	42.90000	8050.70000
CT	4 PIPE INDUCTION 50000 CFM	69.19524	4573.54799	38.28354	6043.96	7.43809	117.74999	75.40000	15359.40000
CT	2 PIPE FAN COIL 200 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 400 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 800 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 1200 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 200 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 400 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 800 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	2 PIPE FAN COIL 1200 CFM	8.32026	195.19052	8.07508	367.12	1.09469	8.98212	2.60000	694.30000
CT	UNIT VENT 400 CFM	13.55640	330.90126	13.11122	700.13	1.82675	4.33790	3.25000	1594.10000
CT	SIN-ZONE DRAW THRU 6500CFM	58.49123	1855.36272	33.91928	3103.31	7.01579	67.96662	36.40000	5997.48000
CT	SIN-ZONE DRAW THRU 10000CFM	59.97518	2432.44767	34.29026	3710.49	7.01579	83.11283	42.90000	8050.70000
CT	SIN-ZONE DRAW THRU 25000CFM	70.09540	4537.64033	43.14064	9157.24	7.39334	151.14634	75.40000	15359.40000
CT	SIN-ZONE DRAW THRU 50000CFM	79.62205	7468.15489	43.14064	9157.24	7.77089	172.56472	105.70000	27305.60000
CT	SIN-ZONE DRAWTHRU 1000CFM	55.28354	1178.39775	33.20577	2361.58	6.88993	67.96662	36.40000	5997.48000
CT	SIN-ZONE DRAWTHRU 2500CFM	57.59107	1855.36272	33.46920	3084.34	6.88993	83.11283	42.90000	8050.70000
CT	UNIT HEATER 400 CFM	13.55640	330.90126	13.11122	700.13	1.82675	4.33790	3.25000	1594.10000
CT	UNIT HEATER 1200 CFM	13.55640	330.90126	13.11122	700.13	1.82675	4.33790	3.25000	1594.10000
CT	UNIT HEATER 4000 CFM	13.55640	330.90126	13.11122	700.13	1.82675	4.33790	3.25000	1594.10000
CT	UNIT HEATER 8000 CFM	13.55640	330.90126	13.11122	700.13	1.82675	4.33790	3.25000	1594.10000
CT	GASFIRED RADIANT HTR 50MBH	9.54356	83.96472	9.29838	299.63	1.26572	0.00000	2.60000	445.20000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 25

Zone: 2	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		D.C. Total					D.C. Total					D.C. Total					D.C. Total				
		labor	material	equipment	total	unit	labor	material	equipment	total	unit	labor	material	equipment	total	unit	labor	material	equipment	total	unit
	HEAT PUMP ST	CT	33.70002	1809.59414	33.20908	CT	33.70002	1809.59414	33.20908	CT	33.70002	1809.59414	33.20908	CT	33.70002	1809.59414	33.20908	CT	33.70002	1809.59414	CT
	HEAT PUMP TOT	CT	23.72112	3462.27370	72.80476	CT	23.72112	3462.27370	72.80476	CT	23.72112	3462.27370	72.80476	CT	23.72112	3462.27370	72.80476	CT	23.72112	3462.27370	CT
	HEAT PUMP ST	CT	92.62234	9594.66563	90.96975	CT	92.62234	9594.66563	90.96975	CT	92.62234	9594.66563	90.96975	CT	92.62234	9594.66563	90.96975	CT	92.62234	9594.66563	CT
	HEAT PUMP TT	CT	32.24002	286.16284	31.80833	CT	32.24002	286.16284	31.80833	CT	32.24002	286.16284	31.80833	CT	32.24002	286.16284	31.80833	CT	32.24002	286.16284	CT
	DUCT COIL 1-ROW H.W.12X24	CT	18.56907	8.57964	9.28454	CT	18.56907	8.57964	9.28454	CT	18.56907	8.57964	9.28454	CT	18.56907	8.57964	9.28454	CT	18.56907	8.57964	CT
	VENTILATION SYSTEM																				
	FIXTURES																				
	FORCE DRAFT FAN 10,000 CFM	CT	31.61449	156.79071	31.61449	CT	31.61449	156.79071	31.61449	CT	31.61449	156.79071	31.61449	CT	31.61449	156.79071	31.61449	CT	31.61449	156.79071	CT
	IND DRAFT FAN 10000 CFM	CT	31.81542	159.58408	31.71496	CT	31.81542	159.58408	31.71496	CT	31.81542	159.58408	31.71496	CT	31.81542	159.58408	31.71496	CT	31.81542	159.58408	CT
	EXHAUST SYSTEM																				
	EQUIPMENT																				
	EXHAUST FAN <200 CFM	CT	1.34826	1.63968	1.34828	CT	1.34826	1.63968	1.34828	CT	1.34826	1.63968	1.34828	CT	1.34826	1.63968	1.34828	CT	1.34826	1.63968	CT
	EXHAUST FAN 1000 CFM	CT	10.07102	41.34397	9.76656	CT	10.07102	41.34397	9.76656	CT	10.07102	41.34397	9.76656	CT	10.07102	41.34397	9.76656	CT	10.07102	41.34397	CT
	EXHAUST FAN 10,000 CFM	CT	31.85770	160.17181	31.73609	CT	31.85770	160.17181	31.73609	CT	31.85770	160.17181	31.73609	CT	31.85770	160.17181	31.73609	CT	31.85770	160.17181	CT
	EXHAUST FAN 20,000 CFM	CT	31.85770	490.00748	15.92885	CT	31.85770	490.00748	15.92885	CT	31.85770	490.00748	15.92885	CT	31.85770	490.00748	15.92885	CT	31.85770	490.00748	CT
	EXHAUST FAN 50,000 CFM	CT	31.85770	490.27018	31.73509	CT	31.85770	490.27018	31.73509	CT	31.85770	490.27018	31.73509	CT	31.85770	490.27018	31.73509	CT	31.85770	490.27018	CT
	EXHAUST FAN 10000 CFM	CT	11.94231	261.73916	10.52896	CT	11.94231	261.73916	10.52896	CT	11.94231	261.73916	10.52896	CT	11.94231	261.73916	10.52896	CT	11.94231	261.73916	CT
	AIR CUP-TAIN, 1000 CFM	CT	2.96133	98.27451	2.96133	CT	2.96133	98.27451	2.96133	CT	2.96133	98.27451	2.96133	CT	2.96133	98.27451	2.96133	CT	2.96133	98.27451	CT
	FIXTURES																				
	METAL FLUE/CHIMNEY	LF	0.00000	0.00000	0.00000	LF	0.00000	0.00000	0.00000	LF	0.00000	0.00000	0.00000	LF	0.00000	0.00000	0.00000	LF	0.00000	0.00000	LF
	SPECIAL SYSTEM																				
	HUMIDITY CONTROL SYSTEM																				
	ROOM HUMIDIFIER, FLOOR TYPE	CT	4.69846	14.81445	4.69846	CT	4.69846	14.81445	4.69846	CT	4.69846	14.81445	4.69846	CT	4.69846	14.81445	4.69846	CT	4.69846	14.81445	CT
	CONTROLS/INSTRUMENT																				
	DEVICES																				
	THERMOSTATS/PNEUMATICS																				
	HUMIDITY SENSOR	CT	9.23749	21.92438	9.23749	CT	9.23749	21.92438	9.23749	CT	9.23749	21.92438	9.23749	CT	9.23749	21.92438	9.23749	CT	9.23749	21.92438	CT
	FLOW SENSOR	CT	9.07951	42.20171	9.07951	CT	9.07951	42.20171	9.07951	CT	9.07951	42.20171	9.07951	CT	9.07951	42.20171	9.07951	CT	9.07951	42.20171	CT
	RADIATION SENSOR	CT	9.20031	18.66807	9.20031	CT	9.20031	18.66807	9.20031	CT	9.20031	18.66807	9.20031	CT	9.20031	18.66807	9.20031	CT	9.20031	18.66807	CT
	WIND VELOCITY SENSOR	CT	9.21731	12.02223	9.21731	CT	9.21731	12.02223	9.21731	CT	9.21731	12.02223	9.21731	CT	9.21731	12.02223	9.21731	CT	9.21731	12.02223	CT
	PRESSURE SENSOR	CT	9.04353	22.31278	9.04353	CT	9.04353	22.31278	9.04353	CT	9.04353	22.31278	9.04353	CT	9.04353	22.31278	9.04353	CT	9.04353	22.31278	CT
	DAMPER CONTROLLER/ELECT.	CT	9.21731	9.08897	9.21731	CT	9.21731	9.08897	9.21731	CT	9.21731	9.08897	9.21731	CT	9.21731	9.08897	9.21731	CT	9.21731	9.08897	CT
	SIMPLEX AIR COMP. 1 HP	CT	9.59517	65.56936	9.59517	CT	9.59517	65.56936	9.59517	CT	9.59517	65.56936	9.59517	CT	9.59517	65.56936	9.59517	CT	9.59517	65.56936	CT
	See NOTES on the last page of this Table for Explanation of Column Headings	CT	32.70602	682.20462	21.52937	CT	32.70602	682.20462	21.52937	CT	32.70602	682.20462	21.52937	CT	32.70602	682.20462	21.52937	CT	32.70602	682.20462	CT

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 26

COMPONENT DESCRIPTION	Zone: 3	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		Washington				equipment				material			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr.	labor	material	equipment	
HVAC													
NATURAL GAS SYSTEM													
EQUIPMENT													
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	
PIPING SYSTEM	TF	1.84268	3.30858	0.92134	42.15	0.25762	0.46257	0.12881	99	1074.4500	1929.20000	537.22500	
PIPE/FITTINGS, STEEL/IRON	CT	0.17151	2.45750	0.17151	8.35	0.01930	0.00000	0.01930	18	0.26000	19.08000	0.26000	
PRESS. REDUCING VALVE, 2"	CT	0.21839	41.64104	0.17821	46.47	0.01930	0.00000	0.01930	18	0.62400	323.30000	0.31200	
FUEL OIL SYSTEM													
STORAGE SYSTEMS													
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	40	2.60000	164.30000	1.30000	
FUEL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	0.39200	0.10400	30	0.65000	10.60000	0.65000	
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000	
DISTRIBUTION SYSTEM	TF	0.03830	0.01760	0.03830	0.89	0.00536	0.00246	0.00536	33	55.51000	1113.00000	27.75500	
PIPE/FITTINGS, COPPER													
LPG SYSTEM													
STORAGE SYSTEM													
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	40	5.20000	1574.10000	2.60000	
DISTRIBUTION SYSTEM	TF	1.84268	3.30858	0.92134	42.15	0.25762	0.46257	0.12881	99	1074.4500	1929.20000	537.22500	
PIPE/FITTINGS, STEEL/IRON													
STEAM CENTRAL													
PRESS. RED. REG. SYSTEM	CT	5.69534	5.40797	5.69534	134.58	0.79626	0.75608	0.79626	36	7.35800	832.10000	3.67900	
STEAM CONVERTER, <300,000	CT	5.80410	25.45092	5.34357	155.61	0.68270	0.63933	0.68270	18	6.50000	147.34000	3.25000	
FLASH TANK, 24 GAL.	CT	5.09340	163.59674	2.54670	270.97	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000	
STEAM REG. VALVE 2"	CT	4.61104	75.42053	4.61104	178.00	0.64467	10.26487	0.64467	40	0.65000	1007.00000	0.65000	
COND. METER, <300 #/HR.													
VALVES													
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	1.43000	20.22480	0.71500	
EQUIPMENT													
CAST IRON RADIATOR, 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	5.20000	175.96000	2.60000	
BASEBOARD RADIATION 10 FT	CT	0.41600	18.57120	0.20800	27.34	0.00000	0.00000	0.00000	24	5.20000	232.14000	2.60000	
FINNED RADIATOR, WALL 10 F	CT	0.41600	20.98800	0.20800	29.76	0.00000	0.00000	0.00000	24	5.20000	262.35000	2.60000	
SOLAR													
EQUIPMENT													
SOLAR PANEL, 3' X 8'	CT	0.45669	40.96158	0.22835	50.59	0.00000	0.00000	0.00000	20	3.90000	349.80000	1.95000	
SOLAR STORAGE TANK, 1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	15.60000	2194.20000	7.60000	
PIPING SYSTEM	TF	0.19568	0.96639	0.16613	5.31	0.02736	0.13511	0.02323	27	41.70530	669.12500	20.85265	
PIPE/FITTINGS, PVC													
HEATING GENERATION													
EQUIPMENT													
BOILER GAS 250 KBTU/HR	CT	273.64997	156.38889	273.64997	6362.77	38.25881	21.86434	38.25881	36	65.00000	3169.40000	32.50000	
BOILER GAS 2000 KBTU/HR	CT	506.74015	302.18625	306.74015	7237.05	42.86313	249.24845	42.86313	36	184.60000	15032.92000	46.15000	
BOILER GAS 10,000 KBTU/HR	CT	827.80324	1785.28756	316.16707	8955.86	103.93614	249.24845	44.20310	36	248.69000	38160.00000	62.17250	
BOILER COAL 40,000 KBTU/HR	CT	1000.4372	22141.28000	601.74616	43555.38	125.17614	0.00000	80.45614	36	1050.4000	148400.00000	262.60000	
REPAIR BOILER													
BOILER OIL 100,000 KBTU/H	CT	311.18329	109.04950	311.18329	7166.69	43.50632	15.24613	43.50632	36	65.00000	3169.40000	32.50000	
REPAIR BOILER	CT	347.50882	109.04950	347.50882	7990.55	48.36497	15.24613	48.36497	36	65.00000	3169.40000	32.50000	
BOILER OIL 250 KBTU/HR	CT	382.84267	121.62155	382.84267	8904.49	53.32497	17.00382	53.32497	36	184.60000	15032.92000	46.15000	
BOILER OIL 10,000 KBTU/HR	CT	316.65889	187.22477	316.65889	7369.05	44.27186	26.17576	44.27186	36	184.60000	38160.00000	62.17250	
BOILER GAS/OIL 2000 KBTU/H	CT	330.79760	3373.76804	330.79760	10875.66	46.24858	471.60026	46.24858	36	651.30000	18689.92000	46.15000	
BOILER GAS/OIL 20000 KBTU	CT	1450.1994	1454.81131	1422.0889	34255.38	197.95239	55.26054	197.95239	14	182.00000	71020.00000	162.82500	
BOILER PNEUMAT. COAL SPREAD.	CT	3117.4735	17411.68370	2492.0657	86115.32	319.53045	63.14958	319.53045	24	10400.000	212000.00000	45.50000	
ASH HANDLING SYSTEM	CT	5.16639	44.13840	2.58319	153.05	0.67080	0.18606	0.67080	18	2.60000	302.10000	1.30000	
FUEL OIL EQUIPMENT	CT	5.01761	55.12413	4.78735	158.19	0.43712	0.00000	0.43712	18	3.25000	389.02000	1.62500	
CHEMICAL FEED SYSTEM	CT	140.76517	390.52520	138.06342	3574.43	19.11369	0.00000	19.11369	18	28.60000	2756.00000	9.53333	
FEED-WATER SUPPLY	CT	158.87692	1696.00000	74.23946	5028.53	19.30472	0.00000	9.65236	24	260.00000	21200.00000	65.00000	
DERATOR													

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	UNIT	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (P=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment	
Zone: 3													
BLOWOFF SYSTEM	CT	0.36842	20.87808	0.18421	28.64	0.00000	0.00000	0.00000	18	2.60000	147.34000	1.30000	
HOUSE FURN. GAS 25KBTU/HR	CT	30.53632	128.83664	29.62643	819.65	4.06699	10.97768	4.06699	18	4.00000	355.10000	5.20000	
HOUSE FURN. GAS 100KBTU/HR	CT	32.05001	160.79649	30.57633	882.97	4.06882	13.13601	4.06882	18	20.80000	471.70000	10.40000	
HOUSE FURN. GAS 200KBTU/HR	CT	32.05001	367.54175	30.57633	1089.72	4.06882	16.00137	4.06882	18	20.80000	1786.10000	10.40000	
HOUSE FURN. OIL 25KBTU/HR	CT	39.69950	237.18515	38.95366	1129.51	5.34307	15.59203	5.34307	18	20.80000	848.00000	5.20000	
HOUSE FURN. OIL 100KBTU/HR	CT	41.16418	514.15675	38.95366	1263.92	5.34307	17.90848	5.34307	18	20.80000	1358.96000	10.40000	
HOUSE FURN. OIL 200KBTU/HR	CT	41.16418	368.45282	38.95366	1207.34	5.34307	19.90848	5.34307	18	20.80000	1598.30000	10.40000	
HOUSE FURN. ELECT. 25KBTU/HR	CT	16.22215	138.39773	15.48531	505.95	2.06197	7.44250	2.06197	18	20.80000	301.00000	5.20000	
HOUSE FURN. ELECT. 100KBTU	CT	17.69583	185.11148	16.22215	579.74	2.06197	10.71719	2.06197	18	20.80000	451.27500	10.40000	
HOUSE FURN. ELECT. 200KBTU/H	CT	17.69583	233.66322	16.22215	630.29	2.06197	13.76862	2.06197	18	20.80000	554.00000	10.40000	
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	5.20000	175.96000	2.60000	
FINISHED RADIATOR, WALL 10 F	CT	0.41600	18.57120	0.20800	27.34	0.00000	0.00000	0.00000	24	5.20000	232.14000	2.60000	
BASEBOARD RADIATOR 10 FT	CT	0.41600	20.98800	0.20800	29.76	0.00000	0.00000	0.00000	24	5.20000	262.35000	2.60000	
EXPANSION TANK	CT	0.03579	0.00000	0.03579	0.81	0.00500	0.00000	0.00500	60	3.47100	135.68000	1.73550	
STEAM CONVERTER, <300,000	CT	5.76263	5.40797	5.76263	136.10	0.80567	0.00000	0.80567	36	7.35800	832.10000	3.67900	
FLASH TANK, 24 GAL.	CT	5.80410	25.45092	5.34357	155.61	0.68270	0.63933	0.68270	18	6.50000	147.34000	3.25000	
STORAGE TANK, DM	CT	8.62920	12.53556	8.83920	212.78	1.23440	1.75259	1.23440	66	3.59395	346.62000	1.79698	
IND. FURN. GAS/OIL 500 MBU	CT	29.86270	252.69187	25.62449	916.42	4.17508	35.32867	3.58254	40	65.00000	6784.00000	16.25000	
IND. FURN. GAS/OIL 2000 MBTU	CT	49.98195	525.35844	49.98195	1658.95	6.98794	73.45000	6.98794	40	184.60000	13780.00000	46.15000	
SURGE TANK, 1000 GAL	CT	0.60892	184.32711	0.30446	197.16	0.00000	0.00000	0.00000	20	5.20000	1574.10000	2.60000	
DIST. PIPING SYSTEM	TF	0.06405	0.02403	0.06405	1.07	0.00644	0.00336	0.00644	60	10.74450	41.34000	5.37225	
PIPE/FITTINGS, STEEL & C.I.	TF	0.06112	0.02008	0.06112	1.41	0.00855	0.00393	0.00855	36	5.55100	51.00720	2.77550	
PIPE/FITTINGS, COPPER	TF	0.16994	0.84461	0.16994	4.70	0.02376	0.11808	0.02376	33	241.80000	8034.80000	120.90000	
PIPE AND FITTINGS, PVC	TF	0.26440	1.51157	0.26440	7.10	0.03445	0.21175	0.03445	33	91.00000	954.00000	91.00000	
PIPE INSULATION	CT	0.00640	1.54401	0.40044	10.63	0.05308	0.01563	0.05308	24	0.26000	17.91600	0.26000	
GATE VALVE, 3/8" - 1 1/2"	CT	0.00640	7.71788	0.13488	10.81	0.01246	0.03126	0.01246	24	0.57200	94.05380	0.57200	
GATE VALVE, 2" - 3"	CT	0.13488	4.11994	0.46415	19.05	0.08369	0.41758	0.08369	24	0.68900	17.91600	0.68900	
DRAIN VALVE	CT	0.54514	2.86585	0.64012	7.14	0.00000	0.00000	0.00000	18	1.43000	20.52480	0.71500	
RADIATOR VALVE 1"	CT	0.20263	163.58674	2.54670	270.97	0.74987	3.72342	0.74987	12	1.50000	75.70520	1.50000	
PRESSURE REDUCER VALVE 2"	CT	5.09340	51.89610	5.72958	181.65	0.74987	3.72342	0.74987	12	1.50000	75.70520	1.50000	
STEAM TRAP, F & T, <1"	CT	5.72958	1.90641	0.31015	8.94	0.04336	0.26653	0.04336	36	91.00000	954.00000	91.00000	
PIPE INSULATION	TF	0.31015	55.63434	1.82861	97.13	0.17247	0.43112	0.17247	18	4.19900	371.00000	4.19900	
CIRCULATION PUMP, < 1 HP	CT	1.82861	209.16754	1.53111	249.69	0.17247	0.43112	0.17247	18	4.19900	1272.00000	2.09950	
CIRCULATION PUMP, 5 HP	CT	1.82861	205.44385	13.62995	526.73	1.81835	7.38247	1.81835	24	15.60000	1908.00000	7.80000	
COOLING GENERATION EQUIPMENT	CT	14.25395											
A/C DX PACKAGE 5T	CT	29.60266	444.56745	29.60266	1115.96	3.64000	0.00000	3.64000	30	8.38500	1855.00000	4.19250	
REPAIR AIR CONDITIONER	CT	69.58570	1546.67841	69.58570	3124.88	9.23000	0.00000	9.23000	15	20.80000	2592.23000	20.80000	
A/C DX PACKAGE 20T	CT								30	20.41000	7950.00000	6.80333	
REPAIR AIR CONDITIONER	CT	88.62836	4674.25901	88.62836	6684.35	11.83000	0.00000	11.83000	15	20.80000	9018.53300	20.80000	
A/C DX PACKAGE 50T	CT								30	20.80000	21200.00000	11.92750	
REPAIR A.C. CONDITIONER	CT	13.12042	91.59914	13.12042	388.87	1.69097	0.05650	1.69097	15	5.98000	27255.15460	23.40000	
A/C WINDOW 1T	CT	13.20940	127.65714	13.20940	427.25	1.69097	0.05650	1.69097	15	5.98000	530.00000	5.98000	
A/C WINDOW 2T	CT	15.89817	256.52668	15.89817	1068.91	4.86305	0.28251	4.86305	15	6.50000	1484.00000	6.50000	
A/C PAD MTD. 4T	CT	70.48010	2182.67841	69.39156	3777.68	9.12676	0.00000	9.12676	15	20.41000	7950.00000	6.80333	
REPAIR AIR CONDITONER	CT	164.27311	878.04570	82.13655	4340.92	22.49000	0.00000	22.49000	15	20.80000	9018.53300	20.80000	
CHILLER-AIR COOL RECIP. 5T	CT	204.12893	1954.24250	101.36217	6255.03	28.53912	273.23128	14.17137	30	28.60000	10759.00000	7.15000	
REPAIR HERMETIC CHILLER	CT	204.12893	5026.49550	101.01102	9326.16	27.95000	0.00000	13.97500	30	40.30000	19080.00000	10.07500	
CHILLER AIR COOL REC. 5T	CT								30	72.80000	40280.00000	18.20000	
CHILLER AIR COOL REC. 10T	CT								30	24.57000	29509.00000	6.14250	
REPAIR HERMETIC CHILLER	CT								30	15.60000	3710.00000	5.20000	
CHILLER-AIR COOL RECIP. 5T	CT								15	19.89000	2003.40000	19.89000	
REPAIR HERMETIC CHILLER	CT								15	20.80000	6360.00000	6.93333	
CHILLER AIR COOL REC. 10T	CT								15	24.57000	3879.60000	12.28500	
REPAIR HERMETIC CHILLER	CT								15	28.60000	8268.00000	7.15000	

See notes on the last page of this table for explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 28

COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Washington D.C. Total				Replacement and High Costs Tasks			
		labor	material	equipment		labor	material	equipment		labor	material	equipment	
REPAIR HERMETIC CHILLER	CT	154.52755	819.50932	82.26377		4207.75	0.00000	11.37500		24.57000	9068.30000	12.28500	
CHILLER WAT. COOL REC. 20T	CT	165.82066	1926.97400	82.39383		5420.82	0.00000	11.37500		29.90000	9540.00000	7.47500	
REPAIR HERMETIC CHILLER	CT	165.82066	4981.04600	82.13558		8474.07	0.00000	11.37500		10.53000	4778.48000	5.26500	
CHILLER WAT. COOL REC. 100T	CT	145.93079	581.72800	72.96539		3657.95	0.00000	10.07500		18.07000	15900.00000	12.02500	
REPAIR HERMETIC CHILLER	CT	165.82066	7562.46400	82.13558		11055.48	0.00000	11.37500		18.07000	11236.00000	6.02333	
CHILLER WAT. COOL REC. 200T	CT	239.96475	3829.76993	119.99237		8888.65	0.00000	16.57500		20.15000	27030.00000	18.52500	
REPAIR HERMETIC CHILLER	CT	239.96475	11416.59379	119.94778		16473.59	0.00000	16.57500		20.15000	29044.00000	4.51750	
CHILL. HERMETIC CENT. 100T	CT	239.96475	34177.06537	119.99237		39235.94	0.00000	16.57500		30.20500	5300.00000	5.20000	
REPAIR CHILLER	CT	239.96475	11416.59379	119.94778		8888.65	0.00000	16.57500		30.20500	5300.00000	5.20000	
CHILL. HERMETIC CENT. 300T	CT	239.96475	34177.06537	119.99237		39235.94	0.00000	16.57500		30.20500	5300.00000	5.20000	
REPAIR CHILLER	CT	239.96475	11416.59379	119.94778		8888.65	0.00000	16.57500		30.20500	5300.00000	5.20000	
CHILL. OPEN CENT. 300T	CT	277.17827	3875.21743	138.58913		9718.14	0.00000	19.17500		30.20500	5300.00000	5.20000	
REPAIR CHILLER	CT	280.03203	16406.72929	140.01601		22309.80	0.00000	19.17500		30.20500	5300.00000	5.20000	
CHILL. DBL. BMDL. HERM. 100T	CT	285.58342	34258.87087	142.79174		40278.97	0.00000	19.17500		30.20500	5300.00000	5.20000	
REPAIR CHILLER	CT	815.07572	1308.88800	60.71029		3868.43	0.00000	8.35500		30.20500	5300.00000	5.20000	
CHILL. ONE STG. ABS. 100T	CT	121.42057	1308.88800	60.71029		3868.43	0.00000	8.35500		30.20500	5300.00000	5.20000	
REPAIR CHILLER	CT	121.42057	1308.88800	60.71029		3868.43	0.00000	8.35500		30.20500	5300.00000	5.20000	
CHILL. TWO STG. ABS. 300T	CT	113.05203	1308.88800	60.71029		3868.43	0.00000	8.35500		30.20500	5300.00000	5.20000	
REPAIR CHILLER	CT	18.44671	151.91602	18.04631		3692.02	0.00000	8.35500		30.20500	5300.00000	5.20000	
AIR COOLED CONDENSER 5T	CT	19.47631	310.16554	9.43309		569.01	0.00000	8.35500		30.20500	5300.00000	5.20000	
AIR COOLED CONDENSER 20T	CT	33.24909	577.52266	15.98116		719.75	0.00000	8.35500		30.20500	5300.00000	5.20000	
AIR COOLED CONDENSER 50T	CT	37.15413	1376.31990	16.28136		1276.25	0.00000	8.35500		30.20500	5300.00000	5.20000	
AIR COOLED CONDENSER 100T	CT	105.57318	601.53039	17.54747		2102.85	0.00000	8.35500		30.20500	5300.00000	5.20000	
COOLING TOWER 100T	CT	124.39235	1872.52009	60.48017		3315.40	0.00000	8.35500		30.20500	5300.00000	5.20000	
COOLING TOWER 300T	CT	138.95632	4227.52009	66.64676		4488.90	0.00000	8.35500		30.20500	5300.00000	5.20000	
EVAPORATIVE CONDENSER 20T	CT	64.03181	460.86601	31.21511		7147.66	0.00000	8.35500		30.20500	5300.00000	5.20000	
EVAPORATIVE CONDENSER 100T	CT	107.29173	1104.00921	51.44367		1808.09	0.00000	8.35500		30.20500	5300.00000	5.20000	
EVAPORATIVE CONDENSER 300T	CT	40.10469	3187.38515	16.05035		3358.67	0.00000	8.35500		30.20500	5300.00000	5.20000	
EXPANSION TANK	CT	0.03579	0.00000	0.03579		4020.06	0.00000	8.35500		30.20500	5300.00000	5.20000	
REFRIG. FAN COIL 1T	CT	5.08833	84.36646	4.97593		199.40	0.00000	8.35500		30.20500	5300.00000	5.20000	
REFRIG. FAN COIL 3T	CT	5.1121	108.53128	4.98537		326.05	0.00000	8.35500		30.20500	5300.00000	5.20000	
REFRIG. FAN COIL 5T	CT	5.14553	142.76875	5.00253		250.01	0.00000	8.35500		30.20500	5300.00000	5.20000	
DIST. PIPING SYSTEM	TF	0.10721	0.05615	0.10761		2.50	0.00000	8.35500		30.20500	5300.00000	5.20000	
PIPE/FITTINGS ST. & C.I.	TF	0.59043	4.10187	0.24839		16.51	0.00000	8.35500		30.20500	5300.00000	5.20000	
PIPE/FITTINGS COPPER	TF	22.40500	757.78995	11.76580		1211.80	0.00000	8.35500		30.20500	5300.00000	5.20000	
PIPE AND FITTINGS, PVC	CT	0.14391	1.54651	0.13491		4.81	0.00000	8.35500		30.20500	5300.00000	5.20000	
GATE VALVE, 3/8"-3"	CT	0.13188	7.71521	0.13188		10.81	0.00000	8.35500		30.20500	5300.00000	5.20000	
DRAIN VALVE	CT	0.44514	4.41621	0.44514		19.03	0.00000	8.35500		30.20500	5300.00000	5.20000	

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE 29		
COMPONENT DESCRIPTION	UM	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Reps		Replacement and High Costs Tasks				
		labor	material	equipment		labor	material	equipment	yr	labor	material	equipment
PIPE INSULATION	TF	0.31015	1.80914	0.31015	8.84	0.04336	0.25293	0.04336	36	91.00000	901.00000	91.00000
CIRCULATOR PUMP < 1 HP	TF	1.81550	55.65134	1.81550	96.83	0.17064	0.43112	0.17064	18	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	3.44413	209.16754	2.33887	283.74	0.17247	4.04400	0.17247	18	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	57.86910	1731.85652	33.81777	2967.36	7.03466	68.14018	4.46404	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	59.21785	2265.97098	34.15496	3528.83	7.03466	83.24955	4.46404	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	68.67019	4270.87729	38.43971	5731.58	7.41334	151.52557	4.82078	13	73.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	77.58303	6902.83606	42.69936	8550.79	7.79203	172.93349	5.20607	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	53.06743	752.76092	32.84970	1891.63	6.09843	53.07733	4.81272	23	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	56.96423	1731.85652	33.36634	2948.33	6.90843	68.14018	4.40093	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	58.31498	2266.55993	33.70353	3510.39	6.90843	83.33189	4.40093	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	67.76732	4256.72262	42.24793	5831.76	7.28712	169.54941	4.76427	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	76.80016	6902.83606	42.24793	8531.76	7.45520	172.93349	5.14295	13	105.30000	27305.60000	26.32500
3 DK MULTI ZONE 10,000 CFM	CT	57.05985	1731.85652	33.81777	2967.36	7.03466	68.13189	4.46404	13	36.40000	5997.48000	9.10000
3 DK MULTI ZONE 25,000 CFM	CT	58.41785	2266.55993	34.15496	3529.42	7.03466	83.31189	4.46404	13	42.90000	8050.70000	10.72500
3 DK MULTI ZONE 50,000 CFM	CT	68.67019	4270.87729	38.43971	5730.94	7.41334	168.13892	4.84273	13	75.40000	15359.40000	18.85000
3 DK MULTI ZONE 100,000 CFM	CT	77.58303	6902.83606	42.69936	8531.76	7.79203	172.93349	5.22214	13	105.30000	27305.60000	26.32500
D.D. VARI VOL 6500 CFM	CT	57.05985	1651.06947	26.72974	2672.974	6.90843	68.14018	3.45421	13	35.00000	5972.00000	9.25000
D.D. VARI VOL 10000 CFM	CT	59.12423	2443.61968	27.13437	3056.82	6.90843	83.33189	3.45421	13	43.80000	8904.00000	11.70000
D.D. VARI VOL 25000 CFM	CT	69.38562	4385.44798	30.37691	6034.29	6.90843	169.07138	3.64356	13	83.20000	16960.00000	20.40000
D.D. VARI VOL 50000 CFM	CT	78.83916	7269.72832	33.41714	9012.43	7.28712	169.32700	3.83290	13	115.00000	29680.00000	28.92500
D.D. VARI VOL 100,000CFM	CT	86.51698	11731.85652	50.76986	17811.42	7.66580	266.37764	3.86337	23	169.00000	48760.00000	42.25000
VARIBLE VOLUME 6500 CFM	CT	56.51598	1731.85652	33.70353	2988.26	6.90843	68.14018	4.40093	13	32.50000	5997.48000	8.12500
VARIBLE VOLUME 10000 CFM	CT	58.31498	2266.55993	33.70353	3510.39	6.90843	83.31189	4.40093	13	42.90000	8050.70000	10.72500
VARIBLE VOLUME 25000 CFM	CT	66.93297	3870.39504	27.26370	5066.69	5.77237	95.53443	3.16387	13	75.40000	15359.40000	18.85000
VARIBLE VOLUME 50000 CFM	CT	76.68016	6902.83606	42.35771	8532.11	7.66500	172.93349	5.15370	13	105.30000	27305.60000	26.32500
TERM. RENEAT 6500 CFM	CT	53.51866	990.04448	32.66751	2137.12	6.95033	68.35945	4.43420	20	37.70000	4279.20000	8.12500
TERM. RENEAT 10000 CFM	CT	54.12758	1222.92527	32.81974	2482.35	6.95033	83.74891	4.43420	20	43.70000	5272.40000	9.42500
TERM. RENEAT 25000 CFM	CT	60.82941	2860.57560	36.55308	4162.50	7.33394	149.86438	4.61782	20	71.50000	12853.60000	17.87500
TERM. RENEAT 50000 CFM	CT	68.44461	3905.84016	40.51476	5368.79	7.71756	171.92120	4.61782	20	113.00000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	53.17866	990.04448	32.66751	2137.12	6.95033	68.35945	4.43420	20	37.70000	4279.20000	8.12500
2 PIPE INDUCTION 10,000 CFM	CT	54.12758	1222.92527	32.81974	2482.35	6.95033	83.74891	4.43420	20	43.70000	5272.40000	9.42500
2 PIPE INDUCTION 25,000 CFM	CT	60.82941	2860.57560	36.55308	4162.50	7.33394	149.86438	4.61782	20	71.50000	12853.60000	17.87500
2 PIPE INDUCTION 50,000 CFM	CT	68.44461	3905.84016	40.51476	5368.79	7.71756	171.92120	4.61782	20	113.00000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	53.17866	990.04448	32.66751	2137.12	6.95033	68.35945	4.43420	20	37.70000	4279.20000	8.12500
4 PIPE INDUCTION 10,000 CFM	CT	54.12758	1222.92527	32.81974	2482.35	6.95033	83.74891	4.43420	20	43.70000	5272.40000	9.42500
4 PIPE INDUCTION 25,000 CFM	CT	60.82941	2860.57560	36.55308	4162.50	7.33394	149.86438	4.61782	20	71.50000	12853.60000	17.87500
4 PIPE INDUCTION 50,000 CFM	CT	68.44461	3905.84016	40.51476	5368.79	7.71756	171.92120	4.61782	20	113.00000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
2 PIPE FAN COIL 1200 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
4 PIPE FAN COIL 200 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
4 PIPE FAN COIL 400 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
4 PIPE FAN COIL 600 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
4 PIPE FAN COIL 1200 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	699.50000	1.30000
UNIT VENT 400 CFM	CT	13.52193	160.21231	13.15033	489.91	1.82254	2.84123	1.82254	23	3.25000	1908.00000	1.62500
UNIT VENT 1200 CFM	CT	13.52193	160.21231	13.15033	489.91	1.82254	2.84123	1.82254	23	3.25000	1908.00000	1.62500
SIN. ZONE DRAIN THRU 6500CFM	CT	52.72103	886.78218	32.53530	1997.86	6.97104	68.53044	4.44852	23	32.50000	4279.20000	9.42500
SIN. ZONE DRAIN THRU 10000CFM	CT	53.17866	1144.70969	36.14670	2285.10	6.97104	83.98355	4.44852	23	37.70000	6181.92000	10.72500
SIN. ZONE DRAIN THRU 25000CFM	CT	58.00253	2418.56490	39.81709	3681.77	7.35624	150.21113	4.83372	23	71.50000	15274.60000	28.27500
SIN. ZONE DRAIN THRU 50000CFM	CT	65.32422	5541.97976	46.41911	4291.31	7.74144	172.08607	5.21893	23	113.00000	22853.60000	31.12500
SIN. ZONE DRAIN THRU 10000CFM	CT	51.04599	273.07576	50.58830	1820.99	6.5	53.07733	4.40093	20	7.80000	1272.00000	5.90000
SIN. ZONE DRAIN THRU 25000CFM	CT	51.92023	706.12092	52.33330	348.32	1.82254	2.84123	1.82254	23	3.25000	1908.00000	1.62500
UNIT HEATER 400 CFM	CT	13.52193	60.89901	13.15033	362.58	1.82254	2.84123	1.82254	23	3.25000	461.00000	1.62500
UNIT HEATER 1200 CFM	CT	13.52193	60.89901	13.15033	362.58	1.82254	2.84123	1.82254	23	3.25000	461.00000	1.62500
UNIT HEATER 4000 CFM	CT	13.52193	105.99247	13.17893	407.68	1.82254	4.62035	1.82254	23	3.25000	828.92000	1.62500

Zone: 3

See NOTES on the last page of this table for explanation of Column Headers

See notes on the last page of this table for explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 30

Zone: 3	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10X)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		D.C. Total					D.C. Total					Labor					Material				
		labor	material	equipment	yr	equipment	labor	material	equipment	yr	equipment	labor	material	equipment	yr	equipment	labor	material	equipment	yr	equipment
UNIT HEATER 8000 CFM	CT	13.32103	150.43721	13.17893	452.12							1.82254	5.38283	1.82254	23	3.25000	1272.00000			1.62500	
GASIFIED RADIANT HTR 50W8H	CT	9.41278	39.17760	9.28333	252.29							1.28401	0.00000	1.28401	23	2.60000	445.20000			1.30000	
HEAT PUMP 5T	CT	30.04856	833.59414	30.04856	1505.10							4.20107	115.14312	4.20107	30	8.38500	2994.50000			4.19250	
HEAT PUMP 10T	CT	70.03160	1338.50747	70.03160	3144.92							9.70107	217.90782	9.70107	30	14.30000	5989.00000			4.76467	
HEAT PUMP 25T	CT	88.62836	4073.30834	88.62836	6083.40							12.39107	549.48442	12.39107	30	19.50000	17755.00000			4.87500	
HEAT PUMP 1T	CT	32.21307	268.10044	31.82070	997.44							4.39397	12.28337	4.39397	18	5.53800	1272.00000			2.76000	
DUCT/COIL 1-ROW H.W. 12X24	CT	18.57388	7.08928	9.28694	398.63							2.36801	0.00000	1.28401	22	2.34000	50.56000			1.17000	
VENTILATION SYSTEM																					
FIXTURES																					
FORCE DRAFT FAN 10,000 CFM	CT	31.61449	156.79071	31.61449	873.81							4.42000	21.92080	4.42000	26	26.00000	2851.40000			6.50000	
IND DRAFT FAN 10000 CFM	CT	31.93819	161.29089	31.77634	885.13							4.46526	22.54997	4.44263	26	26.00000	2929.84000			6.50000	
EXHAUST SYSTEM																					
EQUIPMENT																					
EXHAUST FAN <200 CFM	CT	2.10991	6.52300	2.10991	54.38							0.25864	0.44687	0.25864	24	3.25000	41.58380			3.25000	
EXHAUST FAN 1000 CFM	CT	10.07102	41.34397	9.76656	268.78							1.32289	0.92116	1.32289	20	5.20000	256.80000			2.60000	
EXHAUST FAN 10,000 CFM	CT	33.73261	304.89721	31.97675	1064.33							4.42533	22.43699	4.39795	24	26.00000	1805.18000			6.50000	
EXHAUST FAN 25,000 CFM	CT	33.73261	818.68868	16.34630	1528.11							4.42533	68.45970	2.21266	24	26.00000	4112.80000			6.50000	
EXHAUST FAN 50,000 CFM	CT	34.25261	935.45318	32.10675	1705.44							4.42533	70.32033	4.39795	24	32.50000	5406.00000			8.12500	
EXHAUST FAN 5000 CFM	CT	11.75915	238.55908	10.43666	501.02							1.01334	1.01334	1.30462	18	15.60000	1632.40000			7.00000	
AIR CURTAIN, 1000 CFM	CT	2.46188	8.20864	2.46188	64.04							0.33419	1.14764	0.34419	30	3.25000	689.00000			3.25000	
FIXTURES																					
METAL FLUE/CHIMNEY	LF	1.06561	14.52274	0.53281	36.99							0.00000	0.00000	0.00000	20	9.10000	124.02000			4.55000	
SPECIAL SYSTEM																					
HUMIDITY CONTROL SYSTEM																					
ROOM HUMIDIFIER, FLOOR TYPE	CT	4.70575	30.87489	4.70575	137.60							0.65189	-0.39113	0.65189	12	0.13000	84.80000			0.13000	
CONTROLS/INSTRUMENT.																					
DEVICES																					
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	281.43							1.27872	0.00000	1.27872	20	0.78000	187.22780			0.78000	
HUMIDITY SENSOR	CT	9.20920	17.19552	9.20920	226.08							1.26883	0.00000	1.26883	15	0.78000	100.26540			0.78000	
FLOW SENSOR	CT	9.25262	8.80377	9.25262	218.05							1.26401	0.00000	1.26401	15	0.78000	100.42380			0.78000	
RADIATION SENSOR	CT	9.22470	10.92720	9.22470	220.14							1.27425	0.00000	1.27425	16	0.78000	100.42380			0.78000	
WIND VELOCITY SENSOR	CT	9.05091	21.66630	9.05091	225.94							0.00000	0.00000	0.00000	9	1.56000	91.05400			1.56000	
PRESSURE SENSOR	CT	9.22470	8.26111	9.22470	217.48							1.27425	0.00000	1.27425	18	0.78000	36.50000			0.78000	
DAMPEN CONTROLLER/ELECT.	CT	9.56813	59.59545	9.56813	276.60							1.26229	0.00000	1.26229	13	2.60000	287.20700			2.60000	
SIMPLEX AIR CONPR., 1 HP	CT	32.05923	568.70641	21.21857	1261.12							4.43692	4.41369	2.94392	22	3.67900	6103.82960			1.83950	

See notes on the last page of this table for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	UN	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10X)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					REPLACEMENT AND HIGH COSTS TASKS				
		By Resources					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		Labor	Material	Equipment	D.C. Total		Labor	Material	Equipment	Yr	Labor	Material	Equipment			
Zone: 4																
BLOWOFF SYSTEM 25KBTU/HR	CT	0.40534	22.97031	0.20267	31.51		0.00000	0.00000	0.00000	17	2.40000	147.34000	1.30000			
HOUSE FURN.GAS 100KBTU/HR	CT	30.65372	133.97906	29.84304	826.51		4.05899	10.97768	4.05899	17	20.80000	355.10000	5.20000			
HOUSE FURN.GAS 200KBTU/HR	CT	32.28814	167.49463	30.66678	894.60		4.06082	13.13601	4.06082	17	20.80000	471.70000	10.40000			
HOUSE FURN.OIL 25KBTU/HR	CT	32.28814	392.90437	30.66678	1120.01		5.33248	15.92033	5.33248	17	20.80000	176.10000	5.20000			
HOUSE FURN.OIL 100KBTU/HR	CT	39.76249	243.72739	38.95181	1142.95		5.33248	17.00610	5.33248	17	20.80000	135.40000	5.20000			
HOUSE FURN.OIL 200KBTU/HR	CT	41.38385	333.42739	39.76249	1266.82		5.33248	19.90868	5.33248	17	20.80000	135.40000	5.20000			
HOUSE FURN.ELECT 25KBTU/HR	CT	41.38385	391.10408	39.76249	1324.50		5.33248	7.44250	5.33248	17	20.80000	135.40000	5.20000			
HOUSE FURN.ELECT 100KBTU/HR	CT	16.34214	146.93222	15.53146	514.98		2.05810	10.71719	2.05810	17	20.80000	601.02000	5.20000			
HOUSE FURN.ELECT 200KBTU/HR	CT	17.94330	193.77958	16.34214	596.43		2.05810	13.76862	2.05810	17	20.80000	954.00000	5.20000			
CASE IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00		0.00000	0.00000	0.00000	56	5.20000	232.14000	2.60000			
BASEBOARD RADIATOR 10 FT	CT	0.45740	20.42832	0.22880	32.73		0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000			
FINISHED RADIATOR, WALL 10 F	CT	0.45740	23.04540	0.22880	32.73		0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000			
STEAM CONVERTER, <300,000	CT	0.03465	0.00000	0.03465	0.83		0.00512	0.00000	0.00512	56	3.57100	135.40000	1.75000			
FLASH TANK 24 GAL.	CT	5.84337	27.59030	5.84337	139.23		0.82411	0.77438	0.82411	33	3.57100	135.40000	1.75000			
STORAGE TANK 24 GAL.	CT	5.84337	13.72233	5.84337	64.92		1.35129	0.64592	1.35129	62	3.57100	135.40000	1.75000			
IND.FURN.GAS/OIL 500 MBU	CT	30.23859	237.98442	25.80723	349.22		7.03808	38.84481	7.03808	37	184.50000	13780.00000	48.15000			
IND.FURN.GAS/OIL 2000 MBU	CT	50.24992	577.94286	50.24992	1718.04		7.03808	80.84179	7.03808	37	184.50000	13780.00000	48.15000			
SOURCE TANK, 1000 GAL	CT	0.66978	202.74408	0.33488	216.84		0.00000	0.00000	0.00000	19	5.20000	1374.10000	2.60000			
DIS. PIPING SYSTEM	TF	0.05067	0.02644	0.05067	1.18		0.00708	0.03370	0.00708	56	10.74450	41.34000	5.37225			
PIPE/FITTINGS, ST. & C.I.	TF	0.05260	0.02876	0.05260	1.25		0.00732	0.04022	0.00732	56	10.74450	41.34000	5.37225			
PIPE AND FITTINGS, COPPER	TF	0.84346	3.07498	0.84346	17.51		0.08732	0.04022	0.08732	33	3.55100	51.00720	1.75000			
PIPE INSULATION	TF	0.28196	1.73315	0.28196	8.13		0.03942	0.42937	0.03942	37	91.00000	8034.80000	120.90000			
GATE VALVE, 3/8" - 1 1/2"	CT	0.40232	1.68822	0.40232	10.86		0.03508	0.24231	0.03508	22	0.26000	954.00000	91.00000			
GATE VALVE, 2" - 3"	CT	0.13445	0.50031	0.13445	11.66		0.01246	0.01563	0.01246	22	0.26000	17.91400	0.26000			
DRAIN VALVE	CT	0.70011	8.92754	0.70011	20.81		0.08941	0.48852	0.08941	22	0.26000	94.05380	0.26000			
RADIATOR VALVE 1"	CT	0.22294	3.15305	0.11147	7.85		0.00000	0.00000	0.00000	17	1.43000	20.22480	0.71500			
PRESSURE REDUCER VALVE 2"	CT	5.68620	182.63710	2.84310	302.50		0.74673	3.92624	0.00000	7	1.30000	250.53100	3.90000			
STEAM TRAP, F & T, <1"	CT	5.78191	53.75445	5.78191	164.89		0.04441	0.27298	0.04441	33	91.00000	954.00000	91.00000			
PIPE INSULATION	TF	0.31765	1.95253	0.31765	9.16		0.17293	0.43223	0.17293	17	4.19900	371.00000	4.19900			
CIRCULATION PUMP, < 1 HP	CT	1.89151	60.90550	1.89151	103.83		0.17293	0.43223	0.17293	17	4.19900	371.00000	4.19900			
CIRCULATION PUMP 5 HP	CT	1.89151	227.50434	1.89151	269.36		0.17293	4.08237	0.17293	17	4.19900	1272.00000	2.09950			
COMP. RCVR., 10" - 15 GAL.	CT	14.64517	224.56920	13.95877	534.53		1.85560	7.92232	1.85560	22	15.60000	1908.00000	7.80000			
COOLING GENERATION EQUIPMENT	CT	29.95834	488.89458	29.95834	1168.35		3.64000	0.00000	3.64000	30	8.38500	1855.00000	4.19250			
A/C DX PACKAGE 5T	CT	69.94138	1700.89532	69.94138	3287.17		9.23000	0.00000	9.23000	15	20.80000	2592.23000	20.80000			
REPAIR AIR CONDITIONER	CT	89.02850	5140.32216	89.02850	7159.49		11.83000	0.00000	11.83000	30	47.71000	9018.53300	20.80000			
A/C WINDOW 2T	CT	13.22342	100.40250	13.22342	400.31		1.69108	0.06214	1.69108	15	5.98000	530.00000	5.98000			
A/C WINDOW 1T	CT	13.32149	140.38570	13.32149	442.52		1.69108	0.06214	1.69108	15	5.98000	530.00000	5.98000			
A/C PAD HTO 4T	CT	35.95449	282.10439	35.95449	1095.59		4.85538	0.31072	4.85538	22	6.50000	1482.00000	3.25000			
A/C PAD MOUNTED 20 TON	CT	70.92522	2400.49532	69.72783	4005.25		9.11644	0.00000	9.11644	22	20.41000	7950.00000	20.41000			
CHILLER AIR CONDITIONER	CT	164.61323	965.59428	82.30661	4435.64		22.49000	0.00000	22.49000	30	28.60000	10759.53300	27.15000			
REPAIR HERMETIC CHILLER	CT	204.54907	2149.09700	101.50222	6458.52		28.59786	300.46375	14.10995	30	40.50000	19080.00000	18.07000			
CHILLER AIR COOL REC. 100T	CT	204.54907	5527.67740	101.11666	9835.86		27.95000	0.00000	27.95000	30	72.80000	40380.00000	18.07000			
REPAIR HERMETIC CHILLER	CT	90.22619	377.84124	90.22619	2424.17		12.09000	0.00000	12.09000	30	15.60000	29509.00000	6.14250			
CHILLER-AIR COOL RECIP. 5T	CT	130.16203	731.69256	65.08102	3475.51		17.55000	0.00000	17.55000	30	15.60000	29509.00000	6.14250			
REPAIR HERMETIC CHILLER	CT	167.35555	1710.28138	83.67778	5238.14		22.75000	0.00000	22.75000	30	24.57000	3879.60000	12.28500			
CHILLER AIR COOL REC. 10T	CT	167.35555	1710.28138	83.67778	5238.14		22.75000	0.00000	22.75000	30	24.57000	3879.60000	12.28500			

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	Zone: 4	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10X)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				
		By Resources					Annual Maintenance and Repair				
		Washington					Replacement and High Costs Tasks				
		labor	material	equipment	D.C. Total	yr	labor	material	equipment	yr	labor
REPAIR HERMETIC CHILLER	CT 164.70761	901.22133	82.35380	4373.26		15	24.57000	9068.30000	12.28500		12.28500
CHILLER WAT. COOL. REC. 20T	CT 166.12965	2119.10960	82.49683	5619.31		30	29.90000	9540.00000	7.47500		7.47500
REPAIR HERMETIC CHILLER	CT 166.12965	5477.69840	82.21283	8976.99		30	48.10000	15900.00000	12.02500		12.02500
CHILLER WAT. COOL. REC. 100T	CT 146.11085	639.73120	73.05542	3719.75		30	74.10000	27030.00000	18.52353		18.52353
REPAIR HERMETIC CHILLER	CT 166.12965	8316.50560	82.21283	11815.79		30	74.10000	29044.00000	18.52353		18.52353
CHILLER WAT. COOL. REC. 200T	CT 240.27151	4211.63037	120.13576	9276.55		30	20.80000	5300.00000	5.31750		5.31750
REPAIR HERMETIC CHILLER	CT 240.27151	12554.92472	120.08672	17617.78		30	20.80000	5300.00000	5.31750		5.31750
CHILL. HERMETIC CENT. 300T	CT 240.17344	37504.80775	120.13576	42649.73		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 623.66268	12554.92472	311.83134	25701.73		30	62.40000	37789.00000	4.51750		4.51750
CHILL. HERMETIC CENT. 900T	CT 240.27151	37584.80775	120.13576	42649.73		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 277.45503	10042.61892	140.30167	23957.74		30	62.40000	37789.00000	4.51750		4.51750
CHILL. DR. DR. HERM. 100T	CT 280.60334	37674.76995	143.35416	43718.58		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 286.70832	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
CHILL. DR. DR. HERM. 300T	CT 815.22644	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 121.56729	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
CHILL. ONE STG. ABS. 100T	CT 121.56729	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 121.56729	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
CHILL. ONE STG. ABS. 300T	CT 121.56729	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 121.56729	1439.39520	60.78365	4002.03		30	62.40000	37789.00000	4.51750		4.51750
CHILL. TWO STG. ABS. 100T	CT 113.19875	1439.39520	56.59937	3825.62		30	62.40000	37789.00000	4.51750		4.51750
REPAIR CHILLER	CT 18.55786	159.85521	18.15746	579.47		30	62.40000	37789.00000	4.51750		4.51750
AIR COOLED CONDENSER 5T	CT 19.58746	519.69982	9.48667	731.63		30	62.40000	37789.00000	4.51750		4.51750
AIR COOLED CONDENSER 20T	CT 33.34024	588.68202	15.99372	1289.72		30	62.40000	37789.00000	4.51750		4.51750
AIR COOLED CONDENSER 50T	CT 34.72304	628.21216	17.59193	2149.61		30	62.40000	37789.00000	4.51750		4.51750
AIR COOLED CONDENSER 100T	CT 37.24305	1116.26416	51.48705	3337.96		30	62.40000	37789.00000	4.51750		4.51750
COOLING TOWER 50T	CT 105.64210	1915.17694	60.57643	5533.75		30	62.40000	37789.00000	4.51750		4.51750
COOLING TOWER 100T	CT 124.48127	4270.19984	64.49122	7102.51		30	62.40000	37789.00000	4.51750		4.51750
COOLING TOWER 300T	CT 139.04524	474.45144	31.37756	1825.99		30	62.40000	37789.00000	4.51750		4.51750
EVAPORATIVE CONDENSER 20T	CT 64.23633	1128.09945	51.54592	3384.98		30	62.40000	37789.00000	4.51750		4.51750
EVAPORATIVE CONDENSER 100T	CT 107.69423	3226.17076	1.15240	4063.16		30	62.40000	37789.00000	4.51750		4.51750
EVAPORATIVE CONDENSER 300T	CT 40.31331	85.27236	5.00001	200.92		30	62.40000	37789.00000	4.51750		4.51750
EXPANSION TANK	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
REFRIG. FAN COIL 1T	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
REFRIG. FAN COIL 3T	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
REFRIG. FAN COIL 5T	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
PIPE/FITTINGS SYSTEM	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
PIPE/FITTINGS ST & G.I.	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
PIPE/FITTINGS COPPER	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
PIPE/FITTINGS ALUM.	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
GATE VALVE, 3/8" - 1 1/2"	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750
DRAIN VALVE, 3/8" - 1 1/2"	CT 5.11501	110.12637	5.01205	258.63		30	62.40000	37789.00000	4.51750		4.51750

See NOTES on the last page of this table for Explanation of Column Headings

# EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 34

## COMPONENT DESCRIPTION

Zone: 4

COMPONENT DESCRIPTION	UNIT	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr
PIPE INSULATION	TF	0.31765	1.85291	0.31765	9.06	0.04441	0.25905	0.04441	33
CIRCULATOR PUMP, < 1 HP	CI	1.87826	60.93050	1.87826	103.53	0.17108	4.3223	0.17108	17
5 TON CHILLER ACH RECIP	CI	3.68893	227.50434	2.45291	306.82	0.17293	4.08237	0.17293	17
HEAT/COOL GENERATION EQUIPMENT									
MULTI-ZONE 6500 CFM	CI	57.24498	1618.81444	33.60613	2841.77	7.04358	66.18356	4.47108	14
MULTI-ZONE 10,000 CFM	CI	58.47088	2114.41716	34.00261	3362.24	7.04358	83.33405	4.47108	14
MULTI-ZONE 25,000 CFM	CI	67.31634	3081.05103	38.15305	5414.46	7.42330	151.57078	4.83711	14
MULTI-ZONE 50,000 CFM	CI	73.47144	4385.16033	42.27880	7094.53	7.80302	172.70981	5.21683	14
MULTI-ZONE 2500 CFM	CI	53.09411	753.13178	32.84304	1892.57	7.10317	53.19181	4.51659	22
DUAL DUCT 6500 CFM	CI	54.33666	1618.81444	33.23347	2822.40	6.91701	68.18356	4.40780	14
DUAL DUCT 10,000 CFM	CI	57.54556	2115.00789	33.70039	3343.71	6.91701	83.41641	4.40780	14
DUAL DUCT 25,000 CFM	CI	64.11102	3046.87780	37.70019	5341.21	7.29473	169.40924	4.77183	14
DUAL DUCT 50,000 CFM	CI	74.76812	4385.16033	41.82413	7075.15	7.67644	172.70981	5.1375	14
3 DK. MULTI ZONE 6500 CFM	CI	58.47088	1618.81444	33.23347	2822.40	6.91701	68.18356	4.40780	14
3 DK. MULTI ZONE 10,000 CFM	CI	58.47088	2115.00789	33.70039	3343.71	6.91701	83.41641	4.40780	14
3 DK. MULTI ZONE 25,000 CFM	CI	67.31634	3081.05103	38.15305	5414.46	7.42330	151.57078	4.83711	14
3 DK. MULTI ZONE 50,000 CFM	CI	73.47144	4385.16033	42.27880	7094.53	7.80302	172.70981	5.21683	14
D.D. VARI. VOL. 6500 CFM	CI	58.47088	1618.81444	33.23347	2822.40	6.91701	68.18356	4.40780	14
D.D. VARI. VOL. 10000 CFM	CI	58.47088	2115.00789	33.70039	3343.71	6.91701	83.41641	4.40780	14
D.D. VARI. VOL. 25000 CFM	CI	67.31634	3081.05103	38.15305	5414.46	7.42330	151.57078	4.83711	14
D.D. VARI. VOL. 50000 CFM	CI	73.47144	4385.16033	42.27880	7094.53	7.80302	172.70981	5.21683	14
VAR. VOLUME 6500 CFM	CI	58.47088	1618.81444	33.23347	2822.40	6.91701	68.18356	4.40780	14
VAR. VOLUME 10000 CFM	CI	58.47088	2115.00789	33.70039	3343.71	6.91701	83.41641	4.40780	14
VAR. VOLUME 25000 CFM	CI	67.31634	3081.05103	38.15305	5414.46	7.42330	151.57078	4.83711	14
VAR. VOLUME 50000 CFM	CI	73.47144	4385.16033	42.27880	7094.53	7.80302	172.70981	5.21683	14
TERM. REHEAT 6500 CFM	CI	53.84922	1039.75643	32.72632	2193.46	6.94338	68.30989	4.42913	19
TERM. REHEAT 10000 CFM	CI	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19
TERM. REHEAT 25000 CFM	CI	61.61171	1938.42652	36.72140	4156.43	7.32036	149.71184	4.81211	19
TERM. REHEAT 50000 CFM	CI	69.70907	2709.75643	40.80020	5661.92	7.70933	171.94867	5.19509	19
2 PIPE INDUCTION 4500 CFM	CI	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19
2 PIPE INDUCTION 10000 CFM	CI	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19
2 PIPE INDUCTION 25000 CFM	CI	61.61171	1938.42652	36.72140	4156.43	7.32036	149.71184	4.81211	19
2 PIPE INDUCTION 50000 CFM	CI	69.70907	2709.75643	40.80020	5661.92	7.70933	171.94867	5.19509	19
2 PIPE INDUCTION 4500 CFM	CI	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19
2 PIPE INDUCTION 10000 CFM	CI	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19
2 PIPE INDUCTION 25000 CFM	CI	61.61171	1938.42652	36.72140	4156.43	7.32036	149.71184	4.81211	19
2 PIPE INDUCTION 50000 CFM	CI	69.70907	2709.75643	40.80020	5661.92	7.70933	171.94867	5.19509	19
2 PIPE FAN COIL 200 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
2 PIPE FAN COIL 400 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
2 PIPE FAN COIL 600 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
2 PIPE FAN COIL 1200 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
4 PIPE FAN COIL 200 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
4 PIPE FAN COIL 400 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
4 PIPE FAN COIL 600 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
4 PIPE FAN COIL 1200 CFM	CI	7.87020	106.58286	7.72580	256.69	1.08334	7.67926	1.08334	22
UNIT VENT 400 CFM	CI	13.28252	161.14851	13.16812	468.03	1.82503	2.96794	1.82503	22
UNIT VENT 1200 CFM	CI	13.28252	161.14851	13.16812	468.03	1.82503	2.96794	1.82503	22
SIN. ZONE DRAW THRU 4500CFM	CI	52.74771	867.13251	32.54684	1998.79	6.97477	68.59229	4.45039	22
SIN. ZONE DRAW THRU 10000CFM	CI	53.20531	1145.00055	32.66124	2286.04	6.97477	84.03540	4.45039	22
SIN. ZONE DRAW THRU 25000CFM	CI	58.93690	2419.47120	36.16003	3683.20	7.35997	150.33783	5.20519	22
SIN. ZONE DRAW THRU 50000CFM	CI	65.35090	3243.79220	39.83043	4644.20	7.74517	172.33919	5.20519	22
SIN. ZONE DRAWTHRU 1000CFM	CI	50.78664	284.03647	50.28332	1434.25	6.95985	53.15918	4.45039	22
SIN. ZONE DRAWTHRU 2500CFM	CI	51.94491	706.49178	52.34664	1821.91	6.97477	68.59229	4.45039	22
UNIT HEATER 400 CFM	CI	13.28252	48.74611	13.16812	340.63	1.82503	2.96794	1.82503	22
UNIT HEATER 1200 CFM	CI	13.28252	48.74611	13.16812	340.63	1.82503	2.96794	1.82503	22
UNIT HEATER 4500 CFM	CI	13.28252	108.16759	13.16812	410.25	1.82503	4.92445	1.82503	22

See notes on the last page of this table for explanation of column headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)															PAGE 35
COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)														
	By Resources				Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
	By Resources					Annual Maintenance and Repair									
	Un	Labor	Material	equipment		Labor	Material	equipment	yr	Labor	Material	equipment	Replacement and High Costs Tasks		
Zone: 4															
UNIT HEATER 8000 CFM	CT	13.33972	153.15611	13.19672	455.24	1.82503	5.76296	1.82503	22	3.25000	1272.00000	1.62500			
GASFIRED RAD:ANT HTR 50W3H	CT	9.41278	39.17760	9.29838	252.29	1.28401	0.00000	1.28401	22	2.60000	445.20000	1.30000			
HEAT PUMP 5T	CT	30.44870	905.71344	30.44870	1506.29	4.25701	126.62716	4.25701	30	8.38500	2994.50000	4.19250			
HEAT PUMP 10T	CT	70.43174	1716.01381	70.43174	3311.41	9.84701	239.63507	9.84701	30	14.30000	5989.00000	4.76667			
HEAT PUMP 25T	CT	89.02850	4479.65184	89.02850	6498.62	12.44701	626.26903	12.44701	30	19.50000	17753.00000	4.87500			
HEAT PUMP 1:ROW	CT	31.65111	243.69776	31.29446	960.41	4.32539	11.16603	4.32539	19	5.53800	1272.00000	2.76900			
DUCT/COIL 1-ROW H.W. 12X24	CT	18.57596	6.44480	9.26798	398.03	2.57092	0.00000	1.28546	24	2.34000	80.56000	1.17000			
VENTILATION SYSTEM															
FIXTURES															
FORCE DRAFT FAN 10,000 CFM	CT	33.18336	362.49385	31.76571	1110.56	4.37507	21.69799	4.37507	25	26.00000	2851.40000	6.50000			
IND DRAFT FAN 10000 CFM	CT	33.53951	373.14772	31.94378	1128.72	4.42487	22.39023	4.39997	25	26.00000	2929.84000	6.50000			
EXHAUST SYSTEM															
EQUIPMENT															
EXHAUST FAN <200 CFM	CT	2.25959	7.17598	2.25959	58.42	0.27593	0.49165	0.27593	22	3.25000	41.58380	3.25000			
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000			
EXHAUST FAN 10,000 CFM	CT	33.90525	319.16328	31.99319	1082.02	4.42039	22.41247	4.39300	22	26.00000	1805.18000	6.50000			
EXHAUST FAN 25,000 CFM	CT	33.90525	851.05247	16.38062	1563.94	4.42039	68.30437	2.21019	22	26.00000	4112.80000	6.50000			
EXHAUST FAN 50,000 CFM	CT	34.47725	978.16237	32.13639	1752.62	4.42039	70.24500	4.39300	22	32.50000	5406.00000	8.12500			
EXHAUST FAN, 5000 CFM	CT	11.53516	216.84181	10.33305	474.61	1.33181	0.92116	1.30420	19	15.60000	1632.40000	7.80000			
AIR CURTAIN, 1000 CFM	CT	2.46188	8.20864	2.46188	64.04	0.34419	1.14764	0.34419	30	3.25000	689.00000	3.25000			
FIXTURES															
METAL FLUE/CHIMNEY	LF	1.17208	15.97378	0.58604	40.68	0.00000	0.00000	0.00000	19	9.10000	124.02000	4.55000			
SPECIAL SYSTEM															
HUMIDITY CONTROL SYSTEM															
ROOM HUMIDIFIER, FLOOR TYPE	CT	4.70159	31.55329	4.70159	138.19	0.65116	0.39113	0.65116	11	0.13000	84.80000	0.13000			
CONTROLS/INSTRUMENT															
DEVICES															
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000			
HUMIDITY SENSOR	CT	9.20031	18.91005	9.20031	227.57	1.26572	0.00000	1.26572	15	0.78000	100.26540	0.78000			
FLOW SENSOR	CT	9.25262	8.80377	9.25262	218.65	1.28401	0.00000	1.28401	22	0.78000	100.04280	0.78000			
RADIATION SENSOR	CT	9.23140	9.93241	9.23140	219.30	1.27659	0.00000	1.27659	19	0.78000	77.11500	0.78000			
WIND VELOCITY SENSOR	CT	9.07343	19.69498	9.07343	225.48	0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000			
PRESSURE SENSOR	CT	9.23140	7.50904	9.23140	216.48	1.27659	0.00000	1.27659	19	0.78000	58.30000	0.78000			
DAMPER CONTROLLER/ELECT.	CT	9.54356	54.16724	9.54356	270.62	1.26572	0.00000	1.26572	14	2.60000	287.20700	2.60000			
SIMPLEX AIR COMPR. 1 HP	CT	31.19341	519.04419	20.79153	1193.22	4.31998	4.29743	2.88627	24	3.67900	4103.82980	1.83950			

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See notes on the last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE 36
Zone: 5	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS								
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks				
		Washington D.C. Total				Labor material equipment yr				Labor material equipment				
		un	labor	material	equipment	labor	material	equipment	yr	labor	material	equipment		
HVAC	NATURAL GAS SYSTEM													
	EQUIPMENT													
	GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	
	PIPE/FITTINGS, STEEL/IRON	TF	2.45297	4.40436	1.22648	56.11	0.34225	0.61577	0.17147	81	1074.4500	1929.20000	537.22500	
	PRESS. REDUCING VALVE, 2"	CT	0.18606	3.27222	0.18606	7.49	0.01978	0.00000	0.01978	15	0.26000	19.08000	0.26000	
	PRESS. REDUCING VALVE, 2"	CT	0.24848	55.44595	0.19497	60.91	0.01978	0.00000	0.01978	15	0.62400	323.30000	0.31200	
	FUEL OIL SYSTEM													
	STORAGE SYSTEMS													
	OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	2.60000	164.30000	1.30000	
	OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000	
LPG	FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.50000	620.10000	1.50000	
	DISTRIBUTION SYSTEM													
	PIPE/FITTINGS, COPPER	TF	0.60619	1.10901	0.33752	14.00	0.08475	0.15505	0.04719	27	55.51000	1113.00000	27.75500	
	LPG SYSTEM													
	STORAGE SYSTEM													
	LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	1574.10000	2.60000	
	DISTRIBUTION SYSTEM													
	PIPE/FITTINGS, STEEL/IRON	TF	2.45297	4.40436	1.22648	56.11	0.34225	0.61577	0.17147	81	1074.4500	1929.20000	537.22500	
	STEAM, CENTRAL													
	PRESS. RED./REG. SYSTEM	CT	7.39467	7.01633	7.39467	174.73	1.03384	0.98095	1.03384	28	7.35800	832.10000	3.67900	
SOLAR	STEAM CONVERTOR, <300,000	CT	7.33690	33.58114	6.72395	198.02	0.85438	0.80989	0.85438	14	6.51000	147.53000	3.25000	
	FLASH TANK, 24 GAL.	CT	7.33044	235.44903	3.66522	389.97	0.00000	0.00000	0.00000	6	7.8	250.30000	3.90000	
	STEAM REG. VALVE 2"	CT	4.68670	97.74774	4.68670	204.04	0.65524	13.66604	0.65524	32	0.65	1007.00000	0.65000	
	COND. METER, <300 #/HR.													
	VALVES													
	RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	1.43000	20.22480	0.71500	
	EQUIPMENT													
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	5.20000	175.96000	2.60000	
	BASEBOARD RADIATION 10 FT	CT	0.64976	29.89043	0.33488	44.02	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000	
	FINNED RADIATOR, WALL 10 F	CT	0.66976	33.79068	0.33488	47.91	0.00000	0.00000	0.00000	19	5.20000	262.35000	2.60000	
HEATING	EQUIPMENT													
	SOLAR PANEL, 3' X 8'	CT	0.60801	54.53382	0.30401	67.35	0.00000	0.00000	0.00000	16	3.90000	349.80000	1.95000	
	SOLAR STORAGE TANK, 1000GAL	CT	1.51008	212.39856	0.75504	244.23	0.00000	0.00000	0.00000	22	15.60000	2194.20000	7.80000	
	PIPING SYSTEM													
	PIPE/FITTINGS, PVC	TF	0.16964	0.79935	0.14522	4.57	0.02372	0.11176	0.02030	29	41.70530	669.12500	20.85265	
	EQUIPMENT													
	BOILER GAS 250 KBTU/HR	CT	275.19965	232.61792	275.19965	6472.10	38.46289	32.52215	38.46289	28	65.00000	3169.40000	32.50000	
	BOILER GAS 2000 KBTU/HR	CT	308.19983	449.48920	308.19983	7439.46	43.08920	62.84252	43.08920	28	184.60000	15032.92000	46.15000	
	BOILER GAS 10,000 KBTU/HR	CT	317.62675	2655.52874	317.62675	9859.30	44.40717	371.28761	44.40717	28	248.69000	38160.00000	62.17250	
	BOILER COAL 40,000 KBTU/HR	CT	879.06276	19113.92000	533.51164	37945.30	103.98614	0.00000	69.86114	28	20800.000	636000.00000	4160.00000	
ASH HANDLING	REPAIR BOILER													
	BOILER COAL 100,000 KBTU/H	CT	1064.5496	35647.46080	617.77427	58361.77	125.17614	0.00000	80.45614	28	14600.000	1590000.00000	8320.00000	
	REPAIR BOILER													
	BOILER OIL 250 KBTU/HR	CT	315.15858	162.20585	315.15858	7310.00	44.06210	22.67789	44.06210	28	65.00000	3169.40000	16.25000	
	BOILER OIL 2000 KBTU/HR	CT	349.24802	162.20585	349.24802	8083.15	48.82812	22.67789	48.82812	28	184.60000	15032.92000	46.15000	
	BOILER OIL 10,000 KBTU/HR	CT	394.58186	180.90616	394.58186	8903.22	53.76812	25.29236	53.76812	28	248.69000	38160.00000	62.17250	
	BOILER GAS/OIL 2000 KBTU/H	CT	318.77076	278.48777	318.77076	7508.21	44.56712	38.93518	44.56712	28	184.60000	18689.92000	46.15000	
	BOILER GAS/OIL 20000 KBTU	CT	333.00264	5017.42400	333.00264	12569.92	46.55687	701.48254	46.55687	28	651.30000	71020.00000	162.82500	
	BOILER PNEUMAT. COAL SPREAD.	CT	1449.7797	2535.64826	1399.7169	35256.45	194.06419	88.16157	193.53382	11	182.00000	5618.00000	45.50000	
	ASH HANDLING SYSTEM	CT	3609.5576	27852.08152	2603.4564	106497.33	317.37238	76.40320	317.37238	19	10400.000	212000.00000	2600.00000	
FUEL OIL EQUIPMENT	FUEL OIL EQUIPMENT	CT	5.83540	58.97151	2.91970	182.07	0.74785	0.27898	0.74785	14	2.60000	302.10000	1.30000	
	CHEMICAL FEED SYSTEM	CT	5.13955	73.34917	4.83308	188.95	0.63286	0.00000	0.63286	14	3.25000	389.02000	1.62500	
	FEED-WATER SUPPLY	CT	141.19196	519.78160	137.59599	3710.51	18.98582	0.00000	18.98582	14	28.60000	2756.00000	9.53333	
	DEAERATOR	CT	170.64957	2730.56000	76.95279	6301.06	19.17646	0.00000	9.58823	19	260.00000	21200.00000	65.00000	

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See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION

Zone: 5

UN	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		Labor	Material	Equipment	D.C. Total	Labor	Material	Equipment	Yr	Labor	Material	Equipment	Yr
CT	BLOWOFF SYSTEM	0.49036	27.78832	0.24318	36.13	0.00000	0.00000	0.00000	14	2.60000	147.34000	1.30000	14
CT	HOUSE FURN GAS 25KBTU/HR	31.27935	184.70341	30.29863	890.98	4.09892	16.45997	4.09892	14	10.40000	355.10000	5.20000	14
CT	HOUSE FURN GAS 200KBTU/HR	33.26037	229.84139	31.29893	977.91	4.10165	19.69616	4.10165	14	20.80000	471.70000	10.40000	14
CT	HOUSE FURN GAS 200KBTU/HR	33.26037	508.46716	31.29893	1256.54	4.10165	23.99249	4.10165	14	20.80000	1766.10000	10.40000	14
CT	HOUSE FURN OIL 25KBTU/HR	40.35213	327.15151	39.37141	1239.20	5.36738	23.37873	5.36738	14	20.80000	848.00000	5.20000	14
CT	HOUSE FURN OIL 200KBTU/HR	42.31357	438.59448	40.35213	1391.99	5.36738	25.49900	5.36738	14	20.80000	1358.49600	10.40000	14
CT	HOUSE FURN ELECT 25KBTU/HR	42.31357	514.36673	40.35213	1467.78	5.36738	29.85112	5.36738	14	20.80000	1595.30000	10.40000	14
CT	HOUSE FURN ELECT 200KBTU/HR	17.15643	193.17037	16.17571	579.14	2.12440	11.15930	2.12440	14	20.80000	601.02000	5.20000	14
CT	HOUSE FURN ELECT 200KBTU/H	19.11787	256.62839	17.15643	683.94	2.12440	16.06939	2.12440	14	20.80000	751.27500	10.40000	14
CT	CAST IRON RADIATOR 10 SECT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	5.20000	175.96000	2.60000	47
CT	BASEBOARD RADIATOR 10 FT	0.66976	29.89963	0.33488	44.02	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000	19
CT	FINISHED RADIATOR, WALL 10 F	0.66976	33.79068	0.33488	47.91	0.00000	0.00000	0.00000	19	5.20000	232.35000	2.60000	19
CT	EXPANSION TANK	0.04643	0.00000	0.04643	1.05	0.00649	0.00000	0.00649	47	3.47100	135.48000	1.73550	47
CT	STEAM CONVERTER, <300,000	7.38393	33.58114	7.38393	174.48	0.85438	0.80985	0.85438	28	6.50000	147.34000	3.57900	28
CT	FLASH TANK 24 GAL.	15.53695	15.53695	0.94318	198.02	1.52996	2.17221	1.52996	52	3.50395	346.62000	7.25000	52
CT	STORAGE TANK 200 GAL.	31.50423	366.30391	26.44625	1044.67	4.10486	51.21269	3.69743	32	65.00000	6784.00000	16.25000	32
CT	IMO. FUR GAS/OIL 2000 MBTU	51.27168	761.50328	51.27168	1924.40	7.16823	106.47363	7.16823	32	185.40000	13760.00000	46.15000	32
CT	SURGE TANK, 1000 GAL	0.81068	245.40219	0.40534	262.49	0.00000	0.00000	0.00000	16	5.20000	1574.10000	2.60000	16
TF	PIPE/FITTINGS, ST. & C.I.	0.06130	0.03199	0.06130	1.42	0.00857	0.00447	0.00857	47	10.74450	41.34000	5.37225	47
TF	PIPE/FITTINGS, COPPER	0.07986	0.03668	0.07986	1.43	0.01176	0.00513	0.01176	28	5.55100	51.00720	2.77550	28
TF	PIPE AND FITTINGS, PVC	0.08083	3.08083	0.08083	22.33	0.11508	0.28556	0.11508	28	241.86000	8034.80000	91.00000	28
TF	PIPE INSULATION	0.32911	2.02296	0.32911	9.49	0.04601	0.02883	0.04601	32	91.00000	954.00000	120.90000	32
CT	GATE VALVE, 3/8" - 1 1/2"	0.49280	2.44257	0.49280	13.62	0.06422	0.01891	0.06422	19	0.26000	17.91400	0.26000	19
CT	GATE VALVE, 2" - 3"	0.18149	12.36463	0.18149	16.50	0.01507	0.03782	0.01507	19	0.57200	94.05380	0.57200	19
CT	DRAIN VALVE	0.87698	6.16352	0.87698	26.05	0.11020	0.53913	0.11020	14	0.68900	17.91400	0.68900	14
CT	RADIATOR VALVE 1"	0.26970	3.81440	0.13485	389.97	0.00000	0.00000	0.00000	6	1.43000	20.22480	0.71500	6
CT	PRESSURE REDUCER VALVE 2"	7.33044	235.44903	3.66522	202.15	0.00000	0.00000	0.00000	14	7.80000	250.53100	3.90000	14
CT	STEAM TRAP, F & T, <1"	6.00744	65.90436	6.00744	11.60	0.15058	4.63528	0.15058	9	2.60000	151.41040	2.60000	9
TF	PIPE INSULATION	0.40239	2.47338	0.40239	12.00	0.05626	0.34580	0.05626	28	91.00000	954.00000	91.00000	28
CT	CIRCULATION PUMP, < 1 HP	2.14529	73.34850	2.14529	323.40	0.18921	0.47226	0.18921	14	4.19900	371.00000	4.19900	14
CT	CIRCULATION PUMP 5 HP	2.14529	276.01278	1.74932	323.40	0.18921	5.04901	0.18921	14	4.19900	1272.00000	4.19900	14
CT	COND. RCVR, 10 - 15 GAL.	16.20261	315.91131	15.19797	680.17	1.98436	9.80915	1.98436	19	15.60000	1908.00000	7.80000	19
CT	COOLING GENERATION EQUIPMENT	28.47114	303.55013	28.47114	949.28	3.64000	0.00000	3.64000	39	8.38500	1855.00000	4.19250	39
CT	A/C DX PACKAGE 5T	68.45418	1056.07021	68.45418	2608.61	9.23000	0.00000	9.23000	39	20.41000	2592.23000	20.80000	39
CT	REPAIR AIR CONDITIONER	87.35560	3191.57860	87.35560	5172.80	11.83000	0.00000	11.83000	39	20.80000	9018.53000	6.80333	39
CT	A/C DX PACKAGE 20T	12.81320	62.36659	12.81320	352.97	1.69350	0.04244	1.69350	20	47.71000	2120.00000	21.92750	20
CT	REPAIR AIR CONDITIONER	12.87410	87.19179	12.87410	379.18	1.69350	0.04244	1.69350	20	47.71000	2120.00000	21.92750	20
CT	A/C WINDOW 1T	35.73947	175.29435	35.73947	984.65	4.89029	0.21222	4.89029	20	6.50000	742.00000	3.50000	20
CT	A/C WINDOW 2T	67.45848	1023.96000	65.70394	2648.31	9.06379	0.00000	9.06379	20	23.40000	2725.15460	3.98000	20
CT	A/C PAD MOUNTED 20 TON	599.52858	51.59555	599.52858	4039.60	22.49000	0.00000	22.49000	19	20.41000	7950.00000	6.80333	19
CT	REPAIR AIR CONDITIONER	163.19109	1334.35450	100.91663	5607.68	11.24500	0.00000	11.24500	39	20.80000	10759.00000	7.15000	39
CT	CHILLER-AIR COOL RECIP.20T	202.79232	3432.08390	100.67687	7704.64	14.10908	186.55517	14.10908	39	19.89000	5119.80000	9.94508	39
CT	REPAIR HERMETIC CHILLER	202.79232	3432.08390	100.67687	7704.64	13.97500	0.00000	13.97500	39	40.30000	19080.00000	10.07500	39
CT	CHILLER AIR COOL REC.50T	88.80405	234.59814	88.80405	2248.67	12.09000	0.00000	12.09000	39	24.57000	29309.00000	5.14250	39
CT	REPAIR HERMETIC CHILLER	88.80405	234.59814	88.80405	2248.67	12.09000	0.00000	12.09000	39	24.57000	29309.00000	5.14250	39
CT	CHILLER-AIR COOL RECIP. 5T	128.40528	454.30116	64.20264	3161.08	17.55000	0.00000	17.55000	39	15.60000	3710.00000	5.20000	39
CT	REPAIR HERMETIC CHILLER	128.40528	454.30116	64.20264	3161.08	8.77500	0.00000	8.77500	39	20.80000	2003.40000	6.93333	39
CT	CHILLER AIR COOL REC. 10T	165.59880	1061.89793	82.79940	4552.72	22.75000	0.00000	22.75000	39	28.57000	3879.60000	12.24500	39
CT	REPAIR HERMETIC CHILLER	165.59880	1061.89793	82.79940	4552.72	11.37500	0.00000	11.37500	39	28.57000	3879.60000	12.24500	39

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources			Annual Maintenance and Repair					Replacement and High Costs Tasks				
		Washington			Labor					Labor				
		labor	material	equipment	yr	material	equipment	yr	material	equipment	yr	material	equipment	yr
REPAIR HERMETIC CHILLER	CT	163.95471	559.56001	81.97736		4015.73			22.75000	0.00000	11.37500	20	24.57000	9068.30000
CHILLER WAT. COOL. REC. 20T	CT	164.83765	1315.73560	82.06616		4789.38			22.75000	0.00000	11.37500	20	29.90000	9540.00000
REPAIR HERMETIC CHILLER	CT	164.83765	3401.05240	81.88982		6874.14			22.75000	0.00000	11.37500	20	48.10000	15900.00000
CHILLER WAT. COOL. REC. 10T	CT	145.35795	397.20320	72.67898		3461.35			20.15000	0.00000	10.07500	20	78.10000	11236.00000
REPAIR HERMETIC CHILLER	CT	164.83765	5163.64160	81.88982		8636.73			22.75000	0.00000	11.37500	20	20.80000	27030.00000
CHILLER WAT. COOL. REC. 10T	CT	239.07246	2614.96244	115.53623		7654.61			33.15000	0.00000	16.57500	20	74.10000	5300.00000
REPAIR HERMETIC CHILLER	CT	239.07246	7795.23693	119.50578		12833.60			33.15000	0.00000	16.57500	20	18.07000	44096.00000
CHILL. HERMETIC CENT. 300T	CT	621.64566	23336.06038	119.53623		28375.71			66.45000	0.00000	43.22500	20	16.77000	22331.02000
REPAIR CHILLER	CT	239.07246	7795.23693	119.53623		20899.53			33.15000	0.00000	16.57500	20	16.25000	61771.50000
CHILL. HERMETIC CENT. 900T	CT	276.26598	11202.49563	139.10726		8469.68			38.35000	0.00000	19.17500	20	16.77000	199283.18000
REPAIR CHILLER	CT	282.00505	893.70720	407.30648		17067.26			38.35000	0.00000	19.17500	20	68.90000	22596.02000
CHILL. ONE STG. ABS. 100T	CT	120.95382	893.70720	60.47691		29336.58			113.75000	0.00000	56.87500	20	33.41000	41340.00000
REPAIR CHILLER	CT	120.95382	893.70720	60.47691		18065.75			16.77000	0.00000	8.38500	20	107.90000	27840.00000
CHILL. TWO STG. ABS. 300T	CT	112.58528	893.70720	60.47691		3443.41			16.77000	0.00000	8.38500	20	65.70000	22596.02000
REPAIR CHILLER	CT	17.49823	54.36719	17.49823		3267.00			15.74047	0.00000	7.87023	20	167.70000	13420.00000
AIR COOLED COMPENSER 5T	CT	17.49823	65.29028	8.74912		451.23			2.44642	0.00000	2.44642	29	184.60000	125822.00000
AIR COOLED COMPENSER 20T	CT	30.51597	76.21336	15.25798		434.15			2.44642	0.00000	2.44642	29	20.80000	821.50000
AIR COOLED COMPENSER 100T	CT	33.13325	141.62777	16.57653		840.50			4.26642	0.00000	2.13321	29	31.20000	2438.00000
COOLING TOWER 30T	CT	101.96126	294.30275	59.34917		2796.46			14.25513	0.00000	7.12757	29	46.80000	10578.80000
COOLING TOWER 100T	CT	118.69835	294.30275	59.34917		3012.07			16.59513	0.00000	8.29757	29	52.00000	10070.00000
COOLING TOWER 300T	CT	128.92459	294.30275	64.45507		3177.02			18.02513	0.00000	9.01257	29	128.70000	43162.00000
EVAPORATIVE COMPENSER 20T	CT	60.03321	150.65793	49.31675		115.79			8.51581	0.00000	4.25790	29	36.40000	3688.80000
EVAPORATIVE COMPENSER 100T	CT	23.71663	225.59861	11.85831		120.51			13.84581	0.00000	6.92290	29	100.10000	10038.20000
EXPANSION TANK	CT	0.04643	0.00000	0.04643		132.55			3.31581	0.00000	0.00669	47	3.47100	135.68000
REFRIG. FAN COIL 1T	CT	4.83187	10.92309	4.83187		115.79			0.00669	0.00000	0.00669	47	2.60000	855.42000
REFRIG. FAN COIL 5T	CT	4.83187	22.96331	4.83187		132.55			0.6754	0.00000	0.6754	29	3.25000	1051.52000
PIPE/FITTINGS ST. & C.I.	TF	0.14060	0.07337	0.14060		3.26			0.01966	0.00000	0.01966	28	10.74650	41.36000
PIPE/FITTINGS COPPER	TF	17.7105	6.59549	0.41357		22.94			0.00784	0.00000	0.00784	28	5.51000	51.00720
PIPE AND FITTINGS, PVC	TF	18.53250	669.62896	9.74307		1001.82			0.13333	0.00000	0.13333	24	241.80000	8321.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.19617	2.44257	0.19617		6.89			0.01507	0.00000	0.01507	19	0.68900	17.91400
GATE VALVE, 2"-3"	CT	0.18149	12.38463	0.18149		16.50			0.01507	0.00000	0.01507	19	0.57200	94.05380
DRAIN VALVE	CT	0.87698	6.16352	0.87698		26.05			0.11020	0.00000	0.11020	19	0.68900	17.91400

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 39

COMPONENT DESCRIPTION	UNIT	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (¢=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		Labor	material	equipment	D.C. Total	Labor	material	equipment	material
PIPE INSULATION	TF	0.40239	2.34719	0.40239	11.47	0.05626	0.32816	0.05626	91.00000
CIRCULATOR PUMP, < 1 HP	CT	2.12867	23.34850	2.12867	121.63	0.18689	0.47226	0.18689	91.00000
5 TON CHILLER ACH RECIP	CT	4.29541	276.01278	2.82443	366.73	0.18921	5.04901	0.18921	91.00000
HEAT/COOL GENERATION EQUIPMENT	CT								1272.00000
MULTI-ZONE 6500 CFM	CT	57.24498	1618.81444	33.69613	2841.77	7.04358	68.18356	4.47108	5997.48000
MULTI-ZONE 10,000 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
MULTI-ZONE 25,000 CFM	CT	67.31524	3981.05103	38.15305	5414.46	7.43302	151.70978	4.83711	15359.40000
MULTI-ZONE 50,000 CFM	CT	75.71144	6385.16033	42.27880	7994.53	7.43302	172.70981	5.21683	27305.60000
MULTI-ZONE 6500 CFM	CT	51.31377	343.14377	32.63567	1487.36	7.97534	53.56786	4.56277	4240.60000
DUAL DUCT 6500 CFM	CT	51.31377	343.14377	32.63567	1487.36	7.97534	53.56786	4.56277	4240.60000
DUAL DUCT 10,000 CFM	CT	57.54556	1618.81444	33.69613	2841.77	9.91701	83.41661	4.40780	5997.48000
DUAL DUCT 25,000 CFM	CT	67.31524	3981.05103	38.15305	5414.46	7.43302	151.70978	4.83711	15359.40000
DUAL DUCT 50,000 CFM	CT	75.71144	6385.16033	42.27880	7994.53	7.43302	172.70981	5.21683	27305.60000
3 DX MULTI ZONE 6500 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
3 DX MULTI ZONE 10,000 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
3 DX MULTI ZONE 25,000 CFM	CT	67.31524	3981.05103	38.15305	5414.46	7.43302	151.70978	4.83711	15359.40000
3 DX MULTI ZONE 50,000 CFM	CT	75.71144	6385.16033	42.27880	7994.53	7.43302	172.70981	5.21683	27305.60000
D.D. VARI. VOL. 6500 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
D.D. VARI. VOL. 10,000 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
D.D. VARI. VOL. 25,000 CFM	CT	67.31524	3981.05103	38.15305	5414.46	7.43302	151.70978	4.83711	15359.40000
D.D. VARI. VOL. 50,000 CFM	CT	75.71144	6385.16033	42.27880	7994.53	7.43302	172.70981	5.21683	27305.60000
VARIABLE VOLUME 6500 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
VARIABLE VOLUME 10000 CFM	CT	56.47098	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	8050.70000
VARIABLE VOLUME 25000 CFM	CT	67.31524	3981.05103	38.15305	5414.46	7.43302	151.70978	4.83711	15359.40000
VARIABLE VOLUME 50000 CFM	CT	75.71144	6385.16033	42.27880	7994.53	7.43302	172.70981	5.21683	27305.60000
TERM. REHEAT 6500 CFM	CT	54.61446	1154.89448	32.86232	2746.48	6.92723	68.19423	4.17356	15191.92000
TERM. REHEAT 10000 CFM	CT	55.42514	1560.99498	33.06499	2746.48	6.92723	68.19423	4.17356	15191.92000
TERM. REHEAT 25000 CFM	CT	63.42337	3451.02031	37.11106	4005.26	7.30873	149.55543	4.79886	22853.60000
TERM. REHEAT 50000 CFM	CT	72.43742	4793.18177	41.46113	5340.83	7.69023	172.00816	5.18036	2853.60000
2 PIPE INDUCTION 6500 CFM	CT	54.61446	1154.89448	32.86232	2746.48	6.92723	68.19423	4.17356	15191.92000
2 PIPE INDUCTION 10000 CFM	CT	55.42514	1560.99498	33.06499	2746.48	6.92723	68.19423	4.17356	15191.92000
2 PIPE INDUCTION 25000 CFM	CT	63.42337	3451.02031	37.11106	4005.26	7.30873	149.55543	4.79886	22853.60000
2 PIPE INDUCTION 50000 CFM	CT	72.43742	4793.18177	41.46113	5340.83	7.69023	172.00816	5.18036	2853.60000
4 PIPE INDUCTION 6500 CFM	CT	50.86611	606.95721	32.41684	1596.58	7.11352	149.55543	4.79886	15276.60000
4 PIPE INDUCTION 10000 CFM	CT	50.86611	606.95721	32.41684	1596.58	7.11352	149.55543	4.79886	15276.60000
4 PIPE INDUCTION 25000 CFM	CT	53.18344	1084.76911	34.96026	1691.58	7.43302	151.70978	4.83711	15359.40000
4 PIPE INDUCTION 50000 CFM	CT	55.97296	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 200 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 400 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 600 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 1200 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 200 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 400 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 600 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
2 PIPE FAN COIL 1200 CFM	CT	7.43302	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
UNIT VENT 400 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	3.25000
UNIT VENT 1200 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	3.25000
SIN-ZONE DRAH THRU 6500CFM	CT	50.39393	695.05049	32.17075	1579.67	7.04554	69.21266	4.97777	32.50000
SIN-ZONE DRAH THRU 10000CFM	CT	50.39393	695.05049	32.17075	1579.67	7.04554	69.21266	4.97777	32.50000
SIN-ZONE DRAH THRU 25000CFM	CT	53.18344	1084.76911	34.96026	1691.58	7.43302	151.70978	4.83711	15359.40000
SIN-ZONE DRAH THRU 50000CFM	CT	55.97296	1240.20217	37.74978	1691.58	7.43302	151.70978	4.83711	15359.40000
SIN-ZONE DRAHTHRU 1000CFM	CT	50.39393	318.06978	32.17075	1467.76	6.93325	173.39180	5.27777	151.00000
SIN-ZONE DRAHTHRU 2500CFM	CT	50.39393	318.06978	32.17075	1467.76	6.93325	173.39180	5.27777	151.00000
UNIT HEATER 400 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	3.25000
UNIT HEATER 1200 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	3.25000
UNIT HEATER 4000 CFM	CT	13.13952	26.26775	13.13952	324.27	1.83703	3.67248	1.83703	828.92000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 40

COMPONENT DESCRIPTION	Zone: 5	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10X)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
		D.C. Total					D.C. Total					Labor					Material				
		Unit	Labor	Material	equipment		Labor	Material	equipment		Labor	Material	equipment	yr	Labor	Material	equipment				
UNIT HEATER 8000 CFM		CT	13.13952	29.99153	13.13952		328.00				1.83703	4.19310	1.83703	29	3.25000	1272.00000	1.62500				
GASFIRED RADIANT HTR 50MBH		CT	9.29838	0.00000	9.29838		210.89				1.30000	0.00000	1.30000	29	2.60000	445.00000	1.30000				
HEAT PUMP 5T		CT	28.77540	562.34912	28.77540		1214.96				4.02310	78.62164	4.02310	39	8.38500	2994.50000	4.19250				
HEAT PUMP 10T		CT	68.75864	1064.21536	68.75864		2623.66				9.61310	148.78720	9.61310	39	14.30000	5989.00000	4.76627				
HEAT PUMP 25T		CT	87.35540	2781.25032	87.35540		4762.47				12.21310	388.84466	12.21310	39	19.50000	17755.00000	4.87500				
HEAT PUMP 1T		CT	31.62880	228.81736	31.30445		945.12				4.33135	11.16403	4.33135	19	5.53800	1272.00000	2.74900				
DUCTCOIL 1-ROW H.V. 12X24		CT	18.57786	5.85671	9.28893		397.48				2.57357	0.00000	1.28679	24	2.34000	86.56000	1.17000				
VENTILATION SYSTEM																					
FIXTURES																					
FORCE DRAFT FAN 10,000 CFM		CT	33.70344	430.68430	31.81584		1189.04				4.34018	21.62413	4.34018	22	26.00000	2851.40000	6.50000				
IND DRAFT FAN 10000 CFM		CT	34.13431	444.28741	32.03127		1211.70				4.42042	22.46161	4.39039	22	26.00000	2929.84000	6.50000				
EXHAUST SYSTEM																					
EQUIPMENT																					
EXHAUST FAN <200 CFM		CT	2.83063	9.61021	2.83063		73.81				0.33722	0.59478	0.33722	19	3.25000	41.58380	3.25000				
EXHAUST FAN 1000 CFM		CT	10.07102	41.34397	9.76856		268.78				1.32289	22.44712	1.32289	20	5.20000	298.80000	2.60000				
EXHAUST FAN 10,000 CFM		CT	34.86792	393.06319	32.11936		1175.07				4.40667	68.39068	4.37334	19	26.00000	1805.18000	6.50000				
EXHAUST FAN 25,000 CFM		CT	34.86792	1018.89983	16.95676		1751.24				4.40667	70.64181	4.37334	19	32.50000	4112.80000	6.50000				
EXHAUST FAN 50,000 CFM		CT	35.70512	1201.56539	32.32866		2000.55				0.92116	0.00000	0.92116	19	15.60000	5406.00000	8.12500				
EXHAUST FAN 5000 CFM		CT	11.32785	197.74273	10.25700		452.01				1.33393	0.00000	1.30632	19	3.25000	1632.40000	7.80000				
AIR CURTAIN, 1000 CFM.		CT	2.32460	0.00000	2.32460		52.72				0.32500	0.00000	0.32500	39	3.25000	689.00000	3.25000				
FIXTURES																					
METAL FLUE/CHIMNEY		LF	1.41869	19.33472	0.70935		49.24				0.00000	0.00000	0.00000	16	9.10000	124.02000	4.55000				
SPECIAL SYSTEM																					
HUMIDITY CONTROL SYSTEM																					
ROOM HUMIDIFIER, FLOOR TYPE		CT	4.71982	40.29966	4.71982		147.35				0.04132	0.50544	0.04132	9	0.26000	169.60000	0.26000				
CONTROLS/INSTRUMENT.																					
DEVICES																					
THERMOSTATS/PNEUMATICS		CT	9.23749	21.92438	9.23749		231.43				1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000				
HUMIDITY SENSOR		CT	9.23749	11.74108	9.23749		221.25				1.27872	0.00000	1.27872	20	0.78000	180.26540	0.78000				
FLOW SENSOR		CT	9.23749	0.00000	9.23749		210.89				1.30000	0.00000	1.30000	20	0.78000	100.04240	0.78000				
RADIATION SENSOR		CT	9.23749	0.03017	9.23749		218.54				1.27872	0.00000	1.27872	10	0.78000	77.11500	0.78000				
WIND VELOCITY SENSOR		CT	9.23749	19.16231	9.07951		235.09				0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000				
PRESSURE SENSOR		CT	9.23749	6.82093	9.23749		216.33				1.27872	0.00000	1.27872	10	0.78000	58.30000	0.78000				
DAMPER CONTROLLER/ELECT.		CT	9.23749	56.16753	9.23749		270.42				1.27872	0.00000	1.27872	10	0.78000	287.20700	0.78000				
SIMPLEX AIR COMP., 1 HP		CT	30.91580	474.23893	20.65809		1142.58				4.28492	4.28238	2.86950	24	3.67900	6103.82980	1.83950				

See NOTES on the last page of this table for Explanation of Column Headings

# EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 41

COMPONENT DESCRIPTION	Zone: 6	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS												
		By Resources				Annual Maintenance and Repair					Replacement and High Costs Tasks							
		Washington		D.C. Total		Labor		material		equipment	yr		labor		material		equipment	
		UM	Labor	material	equipment	Labor	material	Labor	material		Labor	material	Labor	material				
HVAC NATURAL GAS SYSTEM EQUIPMENT GAS METER PIPING SYSTEM PIPE/FITTINGS, STEEL/IRON PRESS. REDUCING VALVE, 3" PRESS. REDUCING VALVE, 2" FUEL OIL SYSTEM STORAGE SYSTEMS OIL STORAGE TANK, 275 GAL. OIL FILTER FUEL LEVEL METER DISTRIBUTION SYSTEM PIPE/FITTINGS, COPPER LPG SYSTEM STORAGE SYSTEM LPG STORAGE TANK, 1000 GAL DISTRIBUTION SYSTEM PIPE/FITTINGS, STEEL/IRON STEAM, CENTRAL PRESS. RED./REG. SYSTEM STEAM CONVERTOR, <300,000 FLASH TANK, 24 GAL STEAM REG. VALVE 2" COND. METER, <300 #/HR. VALVES RADIATOR VALVE 1" EQUIPMENT CAST IRON RADIATOR 10 SECT BASEBOARD RADIATOR 10 FT FINED RADIATOR, WALL 10 F	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.89304	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000	0.39000	537.22500	0.26000	0.31200
	TF	3.55750	6.38758	1.77875	81.38	0.49737	0.89304	0.24869	0.01821	0.01821	75	1074.4500	1929.20000	1929.20000	1929.20000	1929.20000	1929.20000	1929.20000
	CT	0.18420	3.95910	0.18420	8.14	0.01821	0.00000	0.01821	0.01821	0.01821	14	0.26000	19.08000	19.08000	19.08000	19.08000	19.08000	19.08000
	CT	0.25973	67.08475	0.19499	72.77	0.01821	0.00000	0.01821	0.01821	0.01821	14	0.62400	323.30000	323.30000	323.30000	323.30000	323.30000	323.30000
	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	0.00000	0.00000	30	2.60000	164.30000	164.30000	164.30000	164.30000	164.30000	164.30000
	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	0.10400	0.10400	30	0.65000	10.60000	10.60000	10.60000	10.60000	10.60000	10.60000
	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	0.03258	0.03258	20	1.30000	620.10000	620.10000	620.10000	620.10000	620.10000	620.10000
	TF	4.76330	82.25412	2.42050	182.79	0.10174	0.18721	0.05630	0.18721	0.18721	25	55.51000	1113.00000	1113.00000	1113.00000	1113.00000	1113.00000	1113.00000
	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	0.00000	0.00000	30	5.20000	1574.10000	1574.10000	1574.10000	1574.10000	1574.10000	1574.10000
	TF	3.55750	6.38758	1.77875	81.38	0.49737	0.89304	0.24869	0.01821	0.01821	75	1074.4500	1929.20000	1929.20000	1929.20000	1929.20000	1929.20000	1929.20000
SOLAR EQUIPMENT SOLAR PANEL, 3' X 8' SOLAR STORAGE TANK, 1000GAL PIPING SYSTEM PIPE/FITTINGS, PVC HEATING GENERATION EQUIPMENT BOILER GAS 250 KBTU/HR BOILER GAS 2000 KBTU/HR BOILER GAS 10,000 KBTU/HR BOILER COAL 40,000 KBTU/HR BOILER COAL 100,000 KBTU/H REPAIR BOILER BOILER OIL 250 KBTU/HR BOILER OIL 2000 KBTU/HR BOILER OIL 10,000 KBTU/HR BOILER GAS/OIL 2000 KBTU/H BOILER GAS/OIL 20000 KBTU BOILER,PNEUMAT. COAL SPREAD. ASH HANDLING SYSTEM FUEL OIL EQUIPMENT CHEMICAL FEED SYSTEM FEED-WATER FEED SYSTEM DEAERATOR	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	0.00000	0.00000	50	1.43000	20.22480	20.22480	20.22480	20.22480	20.22480	
	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	0.00000	50	5.20000	175.96000	175.96000	175.96000	175.96000	175.96000	175.96000	
	CT	0.60892	27.18359	0.30446	40.82	0.00000	0.00000	0.00000	0.00000	20	5.20000	232.14000	232.14000	232.14000	232.14000	232.14000	232.14000	
	CT	0.60892	30.72119	0.30446	43.56	0.00000	0.00000	0.00000	0.00000	20	5.20000	262.35000	262.35000	262.35000	262.35000	262.35000	262.35000	
	CT	0.73554	65.97228	0.36777	81.48	0.00000	0.00000	0.00000	0.00000	15	3.90000	349.80000	349.80000	349.80000	349.80000	349.80000	349.80000	
	CT	1.82676	256.94082	0.91338	295.45	0.00000	0.00000	0.00000	0.00000	20	15.60000	2194.20000	2194.20000	2194.20000	2194.20000	2194.20000	2194.20000	
	TF	0.16964	0.79935	0.14522	4.57	0.02372	0.11176	0.02039	0.11176	30	41.70530	669.12500	669.12500	669.12500	669.12500	669.12500	669.12500	
	CT	1049.1784	32409.29840	613.93147	54811.88	125.17614	0.00000	80.45614	0.00000	80.45614	20	41600.000	1590000.0000	1590000.0000	1590000.0000	1590000.0000	1590000.0000	1590000.0000
	CT	314.98220	159.84730	314.98220	7303.64	44.03744	22.34814	44.03744	22.34814	30	65.00000	3169.40000	3169.40000	3169.40000	3169.40000	3169.40000	3169.40000	
	CT	349.17085	159.84730	349.17085	8079.04	48.01733	22.34814	48.01733	22.34814	30	184.60000	15032.92000	15032.92000	15032.92000	15032.92000	15032.92000	15032.92000	

See NOTES on the last page of this table for Explanation of Column Headings

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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)																														PAGE 42	
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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 43

COMPONENT DESCRIPTION

Zone: 6

COMPONENT DESCRIPTION	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		labor	material	equipment	Washington D.C. Total	labor	material	equipment	Yr
REPAIR HERMETIC CHILLER	CT	166.75793	2568.83622	82.50364	6081.29	22.37754	0.00000	11.18877	10
CHILLER MAT. COOL REC. 20T	CT	171.17980	5275.38683	83.26683	8876.42	22.37754	0.00000	11.18877	20
REPAIR HERMETIC CHILLER	CT	174.22440	11988.78020	83.57051	15650.10	22.37754	0.00000	11.18877	20
CHILLER MAT. COOL REC. 10T	CT	147.40002	1651.11960	73.09109	4756.35	19.82011	0.00000	9.91006	20
REPAIR HERMETIC CHILLER	CT	174.22440	19602.66480	83.57051	23263.92	22.37754	0.00000	11.18877	20
CHILLER MAT. COOL REC. 20T	CT	245.62859	11209.25578	120.98754	16381.23	32.60728	0.00000	16.30364	20
REPAIR HERMETIC CHILLER	CT	249.58083	27457.12308	121.93610	32709.15	32.60728	0.00000	16.30364	20
CHILL. HERMETIC CENT. 100T	CT	257.35030	75437.35008	123.91796	80847.07	32.60728	0.00000	16.30364	20
REPAIR CHILLER	CT	628.20642	27457.12308	311.24890	40690.58	85.03457	0.00000	42.51733	20
CHILL. OPEN CENT. 300T	CT	257.35030	75437.35008	123.91796	80847.07	32.60728	0.00000	16.30364	20
REPAIR CHILLER	CT	282.97434	11705.58486	139.47012	17664.23	37.72215	0.00000	18.86107	20
CHILL. DBL. BML. HERM. 100T	CT	292.59547	37007.41303	143.13946	43165.24	37.72215	0.00000	18.86107	20
REPAIR CHILLER	CT	310.65090	77071.77648	150.11157	83603.61	37.72215	0.00000	18.86107	20
CHILL. DBL. BML. HERM. 300T	CT	810.50623	6663.01160	403.35024	23742.39	111.80772	0.00000	55.94386	20
REPAIR CHILLER	CT	132.77034	9517.90960	63.34057	12306.97	16.49545	0.00000	8.24772	20
CHILL. ONE STG. ABS. 100T	CT	140.22961	15600.08360	65.20539	18540.41	16.49545	0.00000	8.24772	20
REPAIR CHILLER	CT	133.96318	10262.66560	63.64503	13076.42	15.70903	0.00000	7.85451	20
CHILL. TWO STG. ABS. 300T	CT	133.97706	17052.35780	61.58437	19859.30	2.62045	324.16207	7.85451	15
REPAIR CHILLER	CT	20.45927	329.73632	19.60114	791.01	2.62045	24.43886	2.62045	15
AIR COOLED CONDENSER 5T	CT	22.66589	669.72814	10.67913	1145.43	4.39246	29.34896	1.31022	15
REPAIR CHILLER	CT	37.30181	1243.62168	17.17983	2025.24	4.39246	34.25905	2.19623	15
AIR COOLED CONDENSER 20T	CT	40.24397	2972.93218	17.91537	3814.21	4.39246	136.70141	2.19623	15
REPAIR CHILLER	CT	42.47048	1300.00679	19.02862	2188.22	4.70374	63.66380	2.35187	15
AIR COOLED CONDENSER 100T	CT	110.44488	2354.56369	52.77064	4674.90	16.07008	63.66380	7.03504	15
REPAIR CHILLER	CT	131.64424	4034.94459	62.14442	6798.24	16.34838	132.29349	8.17419	15
CHILLING TOWER 100T	CT	151.16478	994.82564	32.93797	2450.36	8.73017	41.81947	8.87034	15
REPAIR CHILLING TOWER 300T	CT	69.30846	982.82359	69.51419	12249.96	17.74068	132.29349	8.87034	15
EVAPORATIVE CONDENSER 20T	CT	18.44040	2377.60001	54.50049	4459.22	13.91963	67.72299	6.95981	15
REPAIR CHILLING TOWER 100T	CT	60.55582	6851.43283	21.69661	8100.49	0.00639	119.39055	0.00639	15
EVAPORATIVE CONDENSER 300T	CT	5.60430	181.28471	5.35912	307.61	0.00639	2.78982	0.00639	15
EXPANSION TANK	CT	5.65334	233.43659	5.38364	340.79	0.71498	4.91009	0.71498	15
REFRIG. FAN COIL 1T	CT	5.72689	307.73337	5.42042	436.64	0.71498	10.32335	0.71498	15
REFRIG. FAN COIL 3T	CT	0.13679	0.07138	0.13679	3.17	0.01912	0.00998	0.01912	30
REFRIG. FAN COIL 5T	CT	0.70610	5.99871	0.38109	20.97	0.00784	0.00360	0.00784	30
PIPE/FITTINGS ST. & C.I.	TF	18.53320	609.62896	9.74307	1001.82	0.13333	0.65402	0.13333	25
PIPE AND FITTINGS COPPER	TF	0.18811	2.21398	0.10811	6.50	0.01891	0.01891	0.01891	20
GATE VALVE, 3/8" - 1 1/2"	CT	0.17840	11.28420	0.17840	15.25	0.01507	0.03782	0.01507	20
GATE VALVE, 2" - 3"	CT	0.83496	5.92197	0.83496	24.82	0.10545	0.53436	0.10545	20
DRAIN VALVE	CT	0.83496	5.92197	0.83496	24.82	0.10545	0.53436	0.10545	20
See NOTES on the last page of this table for Explanation of Column Headings									



COMPONENT DESCRIPTION	Zone: 6	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs	
		labor	material	equipment	D.C. Total	labor	material	yr	material
PIPE INSULATION	CT	0.39597	2.30973	0.39597	11.29	0.05356	0.32292	30	91.00000
CIRCULATOR PUMP	CT	2.12867	73.34850	2.12867	121.63	0.18659	0.47226	15	371.00000
5 TON CHILLER ACH RECIP	CT	4.29551	276.01278	2.82443	368.73	0.18921	5.04901	15	1272.00000
HEAT/COOL GENERATION EQUIPMENT									
MULTI-ZONE 6500 CFM	CT	57.24498	1618.81444	33.69613	2841.77	7.04358	68.18356	15	5997.48000
MULTI-ZONE 10,000 CFM	CT	58.47008	2114.41714	34.00261	3562.24	7.04358	83.33405	15	8050.70000
MULTI-ZONE 25,000 CFM	CT	67.31634	3981.05103	38.15305	5414.46	7.42330	151.59078	15	15359.40000
MULTI-ZONE 50,000 CFM	CT	75.67144	6385.16033	42.27680	7994.43	7.80302	172.70981	15	27305.60000
MULTI-ZONE 2500 CFM	CT	55.28354	1178.39775	33.20577	2361.58	7.04358	52.95050	15	4240.00000
MULTI-ZONE 4500 CFM	CT	56.33066	1618.81444	33.24347	2822.69	6.91701	68.18356	15	5997.48000
DUAL DUCT 10,000 CFM	CT	57.56556	2115.00760	33.54995	3345.74	6.91701	83.41661	15	8050.70000
DUAL DUCT 25,000 CFM	CT	66.41102	3944.87790	37.70039	5381.21	7.29673	149.60924	15	15359.40000
DUAL DUCT 50,000 CFM	CT	74.76512	6335.14033	41.82414	7975.45	7.67644	172.70981	15	27305.60000
3 DK-MULTI ZONE 6500 CFM	CT	56.50842	1618.80345	33.51225	2826.85	7.04358	83.41661	15	8050.70000
3 DK-MULTI ZONE 10,000 CFM	CT	58.47008	2115.00760	34.00261	3562.24	7.42330	151.59078	15	15359.40000
3 DK-MULTI ZONE 25,000 CFM	CT	59.47008	3981.05103	38.15305	5414.46	7.80302	172.70981	15	27305.60000
3 DK-MULTI ZONE 50,000 CFM	CT	67.31634	6385.16033	42.27680	7994.43	7.80302	172.70981	15	27305.60000
D.D. VARI. VOL. 6500 CFM	CT	55.03002	1277.68991	26.57616	2497.87	6.91701	68.18356	15	5997.48000
D.D. VARI. VOL. 10000 CFM	CT	56.30110	1618.80345	26.57616	2497.87	6.91701	83.41661	15	8050.70000
D.D. VARI. VOL. 25000 CFM	CT	67.80210	3981.05103	38.15305	5414.46	7.80302	172.70981	15	27305.60000
D.D. VARI. VOL. 50000 CFM	CT	75.67144	6385.16033	42.27680	7994.43	7.80302	172.70981	15	27305.60000
VARIABLE VOLUME 6500 CFM	CT	85.77994	11239.94693	50.71333	13043.30	7.67644	172.70981	15	27305.60000
VARIABLE VOLUME 10000 CFM	CT	55.60412	1618.81444	33.54995	2826.85	6.91701	83.41661	15	8050.70000
VARIABLE VOLUME 25000 CFM	CT	57.56556	2115.00760	33.54995	3345.74	6.91701	83.41661	15	8050.70000
VARIABLE VOLUME 50000 CFM	CT	57.76612	3579.47894	33.54995	4747.73	6.91701	83.41661	15	8050.70000
TERM. REHEAT 6500 CFM	CT	51.60712	1294.75060	33.05959	2483.76	6.91701	68.18356	15	5997.48000
TERM. REHEAT 10000 CFM	CT	55.60412	1618.81444	33.54995	2826.85	6.91701	83.41661	15	8050.70000
TERM. REHEAT 25000 CFM	CT	65.60412	3579.47894	33.54995	4747.73	6.91701	83.41661	15	8050.70000
TERM. REHEAT 50000 CFM	CT	75.67144	6385.16033	42.27680	7994.43	7.80302	172.70981	15	27305.60000
2 PIPE INDUCTION 6500 CFM	CT	56.50842	1618.80345	33.51225	2826.85	7.04358	83.41661	15	8050.70000
2 PIPE INDUCTION 10000 CFM	CT	58.47008	2115.00760	34.00261	3562.24	7.42330	151.59078	15	15359.40000
2 PIPE INDUCTION 25000 CFM	CT	67.31634	6385.16033	42.27680	7994.43	7.80302	172.70981	15	27305.60000
2 PIPE INDUCTION 50000 CFM	CT	75.67144	6385.16033	42.27680	7994.43	7.80302	172.70981	15	27305.60000
4 PIPE INDUCTION 6500 CFM	CT	55.60412	1618.81444	33.54995	2826.85	6.91701	83.41661	15	8050.70000
4 PIPE INDUCTION 10000 CFM	CT	57.56556	2115.00760	33.54995	3345.74	6.91701	83.41661	15	8050.70000
4 PIPE INDUCTION 25000 CFM	CT	57.76612	3579.47894	33.54995	4747.73	6.91701	83.41661	15	8050.70000
4 PIPE INDUCTION 50000 CFM	CT	57.76612	3579.47894	33.54995	4747.73	6.91701	83.41661	15	8050.70000
2 PIPE FAN COIL 200 CFM	CT	8.32036	179.19712	8.07308	367.12	1.09469	8.98312	15	2.60000
2 PIPE FAN COIL 400 CFM	CT	8.32036	179.19712	8.07308	367.12	1.09469	8.98312	15	2.60000
2 PIPE FAN COIL 600 CFM	CT	8.32036	179.19712	8.07308	367.12	1.09469	8.98312	15	2.60000
2 PIPE FAN COIL 1200 CFM	CT	8.44283	298.14726	8.13317	488.65	1.09469	8.98312	15	2.60000
4 PIPE FAN COIL 200 CFM	CT	8.36930	189.19287	8.09960	378.53	1.09469	8.98312	15	2.60000
4 PIPE FAN COIL 400 CFM	CT	8.41833	332.12458	8.12412	541.08	1.09469	8.98312	15	2.60000
4 PIPE FAN COIL 600 CFM	CT	8.51640	320.37994	8.17315	513.59	1.09469	8.98312	15	2.60000
4 PIPE FAN COIL 1200 CFM	CT	13.55640	590.90126	13.31122	707.13	1.82675	8.98312	15	2.60000
UNIT VENT 400 CFM	CT	13.55640	590.90126	13.31122	707.13	1.82675	8.98312	15	2.60000
UNIT VENT 1200 CFM	CT	13.55640	590.90126	13.31122	707.13	1.82675	8.98312	15	2.60000
SIN-ZONE DRAW THRU 6500CFM	CT	55.60412	1618.81444	33.54995	2826.85	6.91701	83.41661	15	8050.70000
SIN-ZONE DRAW THRU 10000CFM	CT	57.56556	2115.00760	33.54995	3345.74	6.91701	83.41661	15	8050.70000
SIN-ZONE DRAW THRU 25000CFM	CT	57.76612	3579.47894	33.54995	4747.73	6.91701	83.41661	15	8050.70000
SIN-ZONE DRAW THRU 50000CFM	CT	57.76612	3579.47894	33.54995	4747.73	6.91701	83.41661	15	8050.70000
SIN-ZONE DRAWTHRU 1000CFM	CT	50.94570	1078.43975	32.63052	2332.59	6.91701	52.95050	15	4240.00000
SIN-ZONE DRAWTHRU 2500CFM	CT	50.94570	1078.43975	32.63052	2332.59	6.91701	52.95050	15	4240.00000
UNIT HEATER 400 CFM	CT	13.55640	590.90126	13.31122	707.13	1.82675	8.98312	15	2.60000
UNIT HEATER 1200 CFM	CT	13.55640	590.90126	13.31122	707.13	1.82675	8.98312	15	2.60000
UNIT HEATER 4000 CFM	CT	13.55640	590.90126	13.31122	707.13	1.82675	8.98312	15	2.60000

See NOTES on the last page of this Table for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	Zone: 7	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (P=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources				Annual Maintenance and Repair									
		Washington				Replacement and High Costs Tasks									
		Unit	Labor	material	equipment	D.C. Total	Labor	material	equipment	yr	Labor	material	equipment		
HVAC															
NATURAL GAS SYSTEM															
EQUIPMENT															
GAS METER		CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000		0.39000	
PIPING SYSTEM															
PIPE/FITTINGS, STEEL/IRON		TF	0.400770	7.19592	0.00385	91.68	0.56031	1.00406	0.28016	66	1074.4500	1929.20000	537.23500		
PRESS. REDUCING VALVE, 3"		CT	0.21122	5.74308	0.21122	10.53	0.01859	0.00000	0.01859	12	0.26000	19.06000	0.26000		
PRESS. REDUCING VALVE, 2"		CT	0.32079	97.31330	0.22688	104.29	0.01859	0.00000	0.01859	12	0.62400	323.30000	0.51200		
FUEL OIL SYSTEM															
STORAGE SYSTEMS															
OIL STORAGE TANK, 275 GAL.		CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	2.60000	164.30000	1.30000		
OIL FILTER		CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000		
FUEL LEVEL METER		CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000		
DISTRIBUTION SYSTEM															
PIPE/FITTINGS, COPPER		TF	6.24780	109.35588	3.16782	241.20	0.12225	0.22614	0.04727	22	55.51000	1113.00000	27.75500		
LPG SYSTEM															
STORAGE SYSTEM															
LPG STORAGE TANK, 1000 GAL		CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	5.20000	1574.10000	2.60000		
DISTRIBUTION SYSTEM															
PIPE/FITTINGS, STEEL/IRON		TF	4.00770	7.19592	2.00385	91.68	0.56031	1.00406	0.28016	66	1074.4500	1929.20000	537.23500		
STEAM															
PRESS. RED./REG. SYSTEM															
FLASH TANK, <300,000		CT	9.55719	75.08320	9.26287	290.90	1.25389	1.19106	1.25389	23	7.35800	832.10000	3.67900		
STEAM TANK, 24 GAL.		CT	9.51412	55.82359	8.43804	268.16	1.02927	0.98416	1.02927	12	6.50000	147.34000	3.25000		
STEAM REG. VALVE 2"		CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000		
COND. METER, <300 #/HR.		CT	4.78732	130.10043	4.78732	238.68	0.66931	18.18925	0.66931	26	0.65000	1007.00000	0.65000		
VALVES															
RADIATOR VALVE 1"		CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500		
EQUIPMENT															
CAST IRON RADIATOR 10 SECT		CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000		
BASEBOARD RADIATION 10 FT		CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	0.00000	15	5.20000	212.16000	2.60000		
FINED RADIATOR, WALL 10 F		CT	0.89180	44.99303	0.44590	63.79	0.00000	0.00000	0.00000	15	5.20000	282.35000	2.60000		
SOLAR															
EQUIPMENT															
SOLAR PANEL, 3' X 8'		CT	0.80925	72.58350	0.40463	89.66	0.00000	0.00000	0.00000	13	3.90000	349.80000	1.95000		
SOLAR STORAGE TANK, 1000GAL		CT	2.21052	310.91814	1.10526	357.52	0.00000	0.00000	0.00000	18	15.60000	2194.20000	7.80000		
PIPING SYSTEM															
PIPE/FITTINGS, PVC		TF	0.14742	0.66145	0.12724	3.94	0.02061	0.09248	0.01779	33	41.70530	669.12500	20.85265		
HEATING GENERATION															
EQUIPMENT															
BOILER GAS 250 KBTU/HR		CT	278.69517	564.25169	276.09517	6876.74	38.23717	43.43871	38.23717	23	65.00000	3169.40000	32.50000		
BOILER GAS 2000 KBTU/HR		CT	320.26446	1802.99832	309.18846	9031.15	42.71125	83.93637	42.71125	23	184.60000	15032.92000	46.15000		
BOILER GAS 10,000 KBTU/HR		CT	335.08504	6599.69757	320.16364	14151.68	102.82001	495.88927	44.06647	23	248.69000	38160.00000	62.17250		
BOILER COAL 40,000 KBTU/HR		CT	2579.5740	76330.60000	871.91386	129370.83		0.00000	69.07669	23	20800.000	636000.00000	4160.0000		
REPAIR BOILER															
BOILER COAL 100,000 KBTU/H		CT	4438.6121	174665.36900	1290.9404	265260.54	123.77301	0.00000	79.55319	23	41600.000	1590000.00000	8320.0000		
REPAIR BOILER															
BOILER OIL 250 KBTU/HR		CT	321.01919	470.20473	317.11919	7738.44	44.15446	30.29007	44.15446	23	65.00000	3169.40000	16.25000		
BOILER OIL 2000 KBTU/HR		CT	361.92863	1419.28633	350.85263	9592.38	48.53628	30.29007	48.53628	23	184.60000	15032.92000	46.15000		
BOILER OIL 10,000 KBTU/HR		CT	401.99448	3294.43084	387.07308	12363.92	53.42103	33.78213	53.42103	23	248.69000	38160.00000	62.17250		
BOILER GAS/OIL 2000 KBTU/HR		CT	332.18271	1867.16005	321.11071	9365.71	44.37809	52.0437	44.37809	23	184.60000	15032.92000	46.15000		
BOILER GAS/OIL 2000 KBTU		CT	333.69403	12343.19911	344.61603	20960.33	46.35937	936.94588	46.35937	23	651.00000	11202.00000	162.82500		
BOILER PNEUMAT. COIL SPREAD.		CT	1449.9743	32332.03593	1384.1263	55913.13	187.43746	112.08360	186.76637	9	364.00000	7120.00000	91.00000		
ASH HANDLING SYSTEM															
FUEL OIL EQUIPMENT		CT	404.12101	37163.15183	2701.3571	124530.27	315.63489	112.56771	315.63489	15	10400.000	213000.00000	2640.0000		
CHEMICAL FEED SYSTEM		CT	6.51005	102.59422	3.31616	242.40	0.80690	0.35916	0.35916	12	2.60000	302.10000	1.30000		
FEED-WATER SUPPLY		CT	5.18871	128.80452	4.97201	252.08	0.61991	0.00000	0.61991	12	3.25000	389.02000	1.30000		
DEAERATOR		CT	142.51140	916.51140	134.17571	4121.98	18.59733	0.00000	18.59733	12	28.60000	2756.00000	0.33333		
		CT	181.07339	3435.80000	79.58870	7415.87	19.07312	0.00000	9.53636	15	260.00000	21200.00000	65.00000		

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See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (\$100X)										ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
	By Resources					Washington					Annual Maintenance and Repair					Replacement and High Costs Tasks				
	Labor	material	equipment	D.C. Total		Labor	material	equipment	D.C. Total		Labor	material	equipment	yr.	Labor	material	equipment			
Zone: 7																				
VARIABLE VOLUME 5000 CFM	CT 7,421.40	5487.24	41,157.13	7010.24		6,590.23	172,008.16	5,180.36	16,370.85		105,300.00	27305,600.00	26,325.00		105,300.00	27305,600.00	26,325.00			
TERM. REHEAT 5000 CFM	CT 56,156.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
TERM. REHEAT 10000 CFM	CT 57,235.90	1878.70	33,133.78	3100.73		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
TERM. REHEAT 25000 CFM	CT 66,958.07	4239.16	37,895.74	5664.76		7,287.12	169,559.41	4,779.62	17,136.85		113,500.00	15274,600.00	28,275.00		113,500.00	15274,600.00	28,275.00			
TERM. REHEAT 50000 CFM	CT 78,296.66	5970.47	42,763.13	7641.14		7,650.43	172,008.16	5,180.36	16,370.85		113,500.00	15274,600.00	28,275.00		113,500.00	15274,600.00	28,275.00			
2 PIPE INDUCTION 4500 CFM	CT 55,154.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE INDUCTION 10000 CFM	CT 56,156.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE INDUCTION 25000 CFM	CT 66,958.07	4239.16	37,895.74	5664.76		7,287.12	169,559.41	4,779.62	17,136.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE INDUCTION 50000 CFM	CT 78,296.66	5970.47	42,763.13	7641.14		7,650.43	172,008.16	5,180.36	16,370.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE INDUCTION 4500 CFM	CT 55,154.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE INDUCTION 10000 CFM	CT 56,156.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE INDUCTION 25000 CFM	CT 66,958.07	4239.16	37,895.74	5664.76		7,287.12	169,559.41	4,779.62	17,136.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE INDUCTION 50000 CFM	CT 78,296.66	5970.47	42,763.13	7641.14		7,650.43	172,008.16	5,180.36	16,370.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE FAN COIL 200 CFM	CT 55,154.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE FAN COIL 400 CFM	CT 56,156.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE FAN COIL 600 CFM	CT 66,958.07	4239.16	37,895.74	5664.76		7,287.12	169,559.41	4,779.62	17,136.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
2 PIPE FAN COIL 1200 CFM	CT 78,296.66	5970.47	42,763.13	7641.14		7,650.43	172,008.16	5,180.36	16,370.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE FAN COIL 200 CFM	CT 55,154.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE FAN COIL 400 CFM	CT 56,156.08	1375.31	33,164.03	2575.36		6,908.43	68,140.18	4,609.93	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE FAN COIL 600 CFM	CT 66,958.07	4239.16	37,895.74	5664.76		7,287.12	169,559.41	4,779.62	17,136.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
4 PIPE FAN COIL 1200 CFM	CT 78,296.66	5970.47	42,763.13	7641.14		7,650.43	172,008.16	5,180.36	16,370.85		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
UNIT VENT 400 CFM	CT 13,017.73	11,372.63	13,017.73	306.61		1,820.00	1,590.00	1,820.00	4.8		1,820.00	1,590.00	1,820.00	4.8	1,820.00	1,590.00	1,820.00			
SIN. ZONE DRAIN THRU 4500CFM	CT 50,211.25	492.51	32,074.41	1573.28		7,030.00	68,853.70	4,485.00	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
SIN. ZONE DRAIN THRU 10000CFM	CT 50,211.25	492.51	32,074.41	1573.28		7,030.00	68,853.70	4,485.00	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
SIN. ZONE DRAIN THRU 25000CFM	CT 53,000.77	1078.58	34,849.31	1645.19		7,410.00	150,755.60	5,245.00	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
SIN. ZONE DRAIN THRU 50000CFM	CT 55,790.28	1227.99	37,654.44	2232.62		7,800.00	171,656.60	5,745.00	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
SIN. ZONE DRAIN THRU 1000CFM	CT 50,917.29	333.64	32,074.41	1573.28		6,892.44	53,245.23	4,894.44	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
SIN. ZONE DRAIN THRU 2500CFM	CT 50,211.25	330.40	32,074.41	1573.28		6,892.44	53,245.23	4,894.44	13,228.54		37,500.00	4279,220.00	8,125.00		37,500.00	4279,220.00	8,125.00			
UNIT HEATER 400 CFM	CT 13,017.73	11,372.63	13,017.73	306.61		1,820.00	1,590.00	1,820.00	4.8		1,820.00	1,590.00	1,820.00	4.8	1,820.00	1,590.00	1,820.00			
UNIT HEATER 1200 CFM	CT 13,017.73	11,372.63	13,017.73	306.61		1,820.00	1,590.00	1,820.00	4.8		1,820.00	1,590.00	1,820.00	4.8	1,820.00	1,590.00	1,820.00			
UNIT HEATER 4000 CFM	CT 13,017.73	11,372.63	13,017.73	306.61		1,820.00	1,590.00	1,820.00	4.8		1,820.00	1,590.00	1,820.00	4.8	1,820.00	1,590.00	1,820.00			
UNIT HEATER 8000 CFM	CT 13,017.73	11,372.63	13,017.73	306.61		1,820.00	1,590.00	1,820.00	4.8		1,820.00	1,590.00	1,820.00	4.8	1,820.00	1,590.00	1,820.00			
GASIFIED RADIANT NTR 500NH	CT 9,298.38	0.0000	9,298.38	210.89		3,000.00	0.0000	3,000.00	4.8		3,000.00	0.0000	3,000.00	4.8	3,000.00	0.0000	3,000.00			
HEAT PUMP 5T	CT 26,035.46	0.0000	26,035.46	590.48		3,400.00	0.0000	3,400.00	64		3,400.00	0.0000	3,400.00	64	3,400.00	0.0000	3,400.00			
HEAT PUMP 10T	CT 66,018.90	0.0000	66,018.90	1497.30		9,230.00	0.0000	9,230.00	64		9,230.00	0.0000	9,230.00	64	9,230.00	0.0000	9,230.00			
HEAT PUMP 25T	CT 84,615.26	0.0000	84,615.26	1919.07		11,830.00	0.0000	11,830.00	64		11,830.00	0.0000	11,830.00	64	11,830.00	0.0000	11,830.00			
HEAT PUMP 1T	CT 31,102.41	195.73	30,906.68	900.28		4,273.46	10,151.61	4,273.46	22		4,273.46	10,151.61	4,273.46	22	4,273.46	10,151.61	4,273.46			
DUCT/COIL 1-ROW N.H.12x24	CT 18,596.76	0.0000	18,596.76	392.02		2,600.00	0.0000	2,600.00	27		2,600.00	0.0000	2,600.00	27	2,600.00	0.0000	2,600.00			
VENTILATION SYSTEM																				
FIXTURES																				
FORCE DRAFT FAN 10,000 CFM	CT 34,672.38	557.72	34,114.66	1335.26		4,332.44	21,466.53	4,332.44	18		4,332.44	21,466.53	4,332.44	18	4,332.44	21,466.53	4,332.44			
IMO DRAFT FAN 10000 CFM	CT 35,103.73	576.09	34,527.64	1364.61		4,405.33	22,499.86	4,405.33	18		4,405.33	22,499.86	4,405.33	18	4,405.33	22,499.86	4,405.33			
EQUIPMENT																				
EXHAUST FAN <200 CFM	CT 3,454.37	12,795.63	16,250.00	91.14		0.40503	0.79188	0.40503	15		0.40503	0.79188	0.40503	15	0.40503	0.79188	0.40503			
EXHAUST FAN, 1000 CFM	CT 10,071.02	41,343.97	51,415.00	268.78		0.32269	0.92116	0.32269	20		0.32269	0.92116	0.32269	20	0.32269	0.92116	0.32269			
EXHAUST FAN, 10,000 CFM	CT 36,013.72	472,320.34	508,334.06	1277.30		4,411.64	22,723.38	4,411.64	15		4,411.64	22,723.38	4,411.64	15	4,411.64	22,723.38	4,411.64			
EXHAUST FAN 25,000 CFM	CT 37,128.47	1199,261.84	1236,390.31	1954.84		4,411.64	69,054.12	4,411.64	15		4,411.64	69,054.12	4,411.64	15	4,411.64	69,054.12	4,411.64			
EXHAUST FAN 50,000 CFM	CT 37,128.47	1446,264.84	1483,393.31	2272.35		4,411.64	72,310.81	4,411.64	15		4,411.64	72,310.81	4,411.64	15	4,411.64	72,310.81	4,411.64			
EXHAUST FAN, 5000 CFM	CT 11,041.68	164,006.44	175,048.12	411.44		1,332.61	0.83767	1,332.61	22		1,332.61	0.83767	1,332.61	22	1,332.61	0.83767	1,332.61			
AIR CURTAIN, 1000 CFM	CT 2,326.40	0.0000	2,326.40	52.72		0.32500	0.00000	0.32500	64		0.32500	0.00000	0.32500	64	0.32500	0.00000	0.32500			
FIXTURES																				
METAL BLUE/CHIMNEY	LF 1,888.25	25,734.15	27,622.40	65.54		0.00000	0.00000	0.00000	13		0.00000	0.00000	0.00000	13	0.00000	0.00000	0.00000			
SPECIAL SYSTEM																				
HUMIDITY CONTROL SYSTEM																				
ROOM MODIFIER,FLOOR TYPE	CT 4,680.75	56,823.21	61,503.96	162.98		0.04947	0.60447	0.04947	8		0.04947	0.60447	0.04947	8	0.04947	0.60447	0.04947			
CONTROLS/INSTRUMENT																				
See NOTES on the last page of this table for Explanation of Column Headings																				

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE 47	
Zone: 7	COMPONENT DESCRIPTION	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources					Washington				
		labor		material		equipment	labor		material		equipment
		yr	material	yr	material	yr	material	yr	material	yr	material
	BLOWOFF SYSTEM	CT	0.86086	48.78427	0.43043	66.93	0.00000	0.00000	12	2.60000	1.30000
	HOUSE FURN. GAS 25KBTU/HR	CT	32.54717	269.13930	30.82545	1001.80	4.06897	0.00000	12	10.40000	5.20000
	HOUSE FURN. GAS 100KBTU/HR	CT	36.01581	337.54492	32.57237	1143.36	4.07250	4.07250	12	20.80000	10.40000
	HOUSE FURN. GAS 200KBTU/HR	CT	36.01581	812.30397	32.57237	1618.12	4.07250	4.07250	12	20.80000	10.40000
	HOUSE FURN. OIL 25KBTU/HR	CT	41.44032	496.04746	39.71860	1430.40	5.31232	5.31232	12	20.80000	10.40000
	HOUSE FURN. OIL 100KBTU/HR	CT	44.88376	684.59640	41.44032	1691.54	5.31232	5.31232	12	20.80000	10.40000
	HOUSE FURN. OIL 200KBTU/HR	CT	44.88376	803.07720	41.44032	1810.02	5.31232	5.31232	12	20.80000	10.40000
	HOUSE FURN. ELECT. 25KBTU/HR	CT	18.82473	301.75412	17.10301	723.19	2.15045	2.15045	12	10.40000	5.20000
	HOUSE FURN. ELECT. 100KBTU	CT	22.26817	396.71637	18.82473	890.74	2.15045	2.15045	12	10.40000	5.20000
	HOUSE FURN. ELECT. 200KBTU/H	CT	22.26817	505.96874	18.82473	999.99	2.15045	2.15045	12	10.40000	5.20000
	CAST IRON RADIATOR 10 FEET	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	39	5.20000	2.60000
	BASEBOARD RADIATOR, WALL 10 F	CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	15	5.20000	2.60000
	EXPANSION TANK	CT	0.05949	75.08720	0.05949	1.35	0.00832	0.00832	39	5.20000	2.60000
	STEAM CONVERTER, <300,000	CT	9.48014	55.83359	8.43804	289.16	1.02927	1.02927	15	5.20000	2.60000
	FLASH TANK, 24 GAL.	CT	9.51612	19.69937	13.87505	248.16	1.02927	1.02927	15	5.20000	2.60000
	STORAGE TANK, DW	CT	13.87505	487.27591	27.37125	334.39	1.93966	0.98416	23	3.47000	1.73500
	IND. FURN. GAS/OIL 500 MBTU	CT	33.25622	1013.04983	52.64455	1222.54	4.64953	2.75418	23	7.35000	3.67900
	IND. FURN. GAS/OIL 2000 MBTU	CT	52.64455	326.62575	0.53950	2207.05	7.34020	141.63658	24	65.00000	3.25000
	SURGE TANK, 1000 GAL	CT	1.07900	0.00000	0.00000	349.37	0.00000	0.00000	44	3.59395	1.79698
	DIST. PIPING SYSTEM	CT	0.10761	0.05615	0.10761	2.50	0.01504	0.00785	66	184.60000	16.25000
	PIPE/FITTINGS, ST. & C.I.	TF	0.54360	4.12829	0.32156	15.74	0.01391	0.00639	13	5.20000	2.60000
	PIPE AND FITTINGS, COPPER	TF	24.53204	783.31059	12.82972	1302.27	0.15751	0.77482	39	10.74450	5.37225
	PIPE INSULATION	TF	0.42612	2.61923	0.42612	12.28	0.05958	0.36619	23	24.18000	12.09000
	GATE VALVE, 3/8" - 1 1/2"	CT	0.72132	3.27152	0.72132	19.63	0.09461	0.02786	26	91.00000	91.00000
	GATE VALVE, 2" - 3"	CT	0.25695	16.52877	0.25695	22.36	0.09461	0.02786	26	91.00000	91.00000
	DRAIN VALVE	CT	1.07104	8.13252	1.07104	32.42	0.13322	0.05572	15	0.26000	0.13000
	RADIATOR VALVE 1"	CT	0.47347	6.69643	0.23674	16.68	0.03221	0.17072	15	0.57200	0.28600
	PRESSURE REDUCER VALVE 2"	CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	15	0.69000	0.34500
	STEAM TRAP, F & T, <1"	CT	6.44052	89.62297	6.44052	235.69	0.00000	0.00000	13	1.43000	0.69000
	PIPE INSULATION	TF	7.76858	79.32317	7.76858	255.51	0.19418	0.97739	12	2.60000	1.30000
	CIRCULATION PUMP, <1 HP	CT	2.85566	126.49060	2.85566	191.26	0.06831	0.41985	8	2.60000	1.30000
	CIRCULATION PUMP, 5 HP	CT	2.85566	464.59143	2.85566	527.13	0.20487	0.51065	23	91.00000	91.00000
	COND. RCVR., 10 - 15 GAL.	CT	17.89411	412.32609	16.55641	813.48	2.12772	11.89834	12	4.19900	2.09950
	COOLING GENERATION EQUIPMENT	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	15	15.60000	7.80000
	A/C DX PACKAGE 5T	CT	66.01850	0.00000	66.01850	1497.30	0.00000	0.00000	64	8.38500	4.19250
	A/C DX PACKAGE 20T	CT	84.61526	0.00000	84.61526	1919.07	0.00000	0.00000	64	20.41000	10.20500
	A/C WINDOW 1T	CT	12.08789	0.00000	12.08789	274.15	1.89000	1.89000	32	5.98000	2.99000
	A/C WINDOW 2T	CT	35.33384	0.00000	35.33384	801.37	4.94000	4.94000	32	6.50000	3.25000
	A/C PAD MTD, 4T	CT	67.93587	1363.42500	65.60232	2896.74	9.00869	9.00869	32	6.50000	3.25000
	CHILLER-AIR COOL RECIP. 20T	CT	160.86197	0.00000	160.86197	3390.97	22.49000	0.00000	15	20.41000	10.20500
	CHILLER-AIR COOL REC. 50T	CT	199.91517	0.00000	199.91517	4214.21	27.95000	0.00000	64	20.80000	10.40000
	CHILLER-AIR COOL REC. 100T	CT	199.91517	0.00000	199.91517	4214.21	27.95000	0.00000	64	20.80000	10.40000
	CHILLER-AIR COOL RECIP. 5T	CT	86.47493	0.00000	86.47493	1961.25	12.09000	0.00000	64	20.80000	10.40000
	CHILLER-AIR COOL REC. 10T	CT	125.52813	0.00000	125.52813	2646.13	12.09000	0.00000	64	20.80000	10.40000
	CHILLER-WAT. COOL REC. 50T	CT	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	64	20.80000	10.40000
	CHILLER-WAT. COOL REC. 15T	CT	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	64	20.80000	10.40000
	CHILLER-WAT. COOL REC. 20T	CT	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	64	20.80000	10.40000
	CHILLER-WAT. COOL REC. 50T	CT	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	64	20.80000	10.40000
	CHILLER-WAT. COOL REC. 10T	CT	144.12489	0.00000	144.12489	3038.15	20.15000	0.00000	64	20.80000	10.40000
	CHILLER-WAT. COOL REC. 200T	CT	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	64	20.80000	10.40000
	CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	237.10869	4998.25	33.15000	0.00000	64	97.50000	48.75000
	CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	237.10869	4998.25	33.15000	0.00000	64	97.50000	48.75000
	CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	237.10869	4998.25	33.15000	0.00000	64	162.50000	81.25000

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See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 50
Zone: 7	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10%)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources					Annual Maintenance and Repair						
		Um	Washington			D.C. Total	Annual Maintenance and Repair			Replacement and High Costs Tasks			
			labor	material	equipment		labor	material	equipment	yr	labor	material	equipment
	DEVICES												
	THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
	HUMIDITY SENSOR	CT	9.23749	0.00000	9.23749	210.89	1.30000	0.00000	1.30000	32	0.78000	100.26540	0.78000
	FLOW SENSOR	CT	9.23749	0.00000	9.23749	210.89	1.30000	0.00000	1.30000	32	0.78000	100.26540	0.78000
	RADIATION SENSOR	CT	9.23749	7.44673	9.23749	217.21	1.28241	0.00000	1.28241	22	0.78000	77.11500	0.78000
	WIND VELOCITY SENSOR	CT	9.23749	16.98157	9.23749	233.47	1.28241	0.00000	1.28241	22	0.78000	45.52700	0.78000
	PRESSURE SENSOR	CT	9.23749	5.64344	9.23749	215.39	1.28241	0.00000	1.28241	22	0.78000	58.30000	0.78000
	DAMPER CONTROLLER/ELECT.	CT	9.50105	44.77557	9.50105	260.26	1.27166	0.00000	1.27166	16	2.60000	287.20700	2.60000
	SIMPLEX AIR COMP. 1 HP	CT	27.35724	27.21641	18.93221	620.72	3.82480	3.80511	2.64590	27	3.67900	6103.82960	1.83950

See notes on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)															PAGE	51
COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10%)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS										
	By Resources				Washington D.C. Total	Annual Maintenance and Repair				Replacement and High Costs Tasks						
	um	labor	material	equipment		labor	material	equipment	yr	labor	material	equipment				
Zone: 8																
HVAC																
NATURAL GAS SYSTEM																
EQUIPMENT																
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000				
PIPING SYSTEM	TF	4.54599	8.13233	2.28481	104.00	0.63557	1.13698	0.31944	62	1074.4500	1929.20000	537.22500				
PIPE/FITTINGS, STEEL/IRON	CT	0.22204	6.31739	0.22204	11.35	0.01901	0.00000	0.01901	12	0.26000	19.08000	0.26000				
PRESS. REDUCING VALVE, 5"	CT	0.34256	107.04463	0.23926	114.48	0.01901	0.00000	0.01901	12	0.62400	323.30000	0.31200				
FUEL OIL SYSTEM																
STORAGE SYSTEMS																
OIL STORAGE TANK, 275 GAL.	CT	0.18902	11.94461	0.09451	15.93	0.00000	0.00000	0.00000	25	2.60000	164.30000	1.30000				
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.92000	0.10400	30	0.65000	10.60000	0.65000				
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000				
DISTRIBUTION SYSTEM																
PIPE/FITTINGS, COPPER	TF	6.86769	120.31123	3.47908	265.23	0.13364	0.24840	0.07314	21	55.51000	1113.00000	27.75500				
LPG SYSTEM																
STORAGE SYSTEM																
LPG STORAGE TANK, 1000 GAL	CT	0.37804	114.43707	0.18902	122.41	0.00000	0.00000	0.00000	25	5.20000	1574.10000	2.60000				
DISTRIBUTION SYSTEM																
PIPE/FITTINGS, STEEL/IRON	TF	4.52236	8.12000	2.26118	103.45	0.63227	1.13525	0.31613	62	1074.4500	1929.20000	537.22500				
STEAM																
CENTRAL																
PRESS. RED./REG. SYSTEM	CT	9.55719	75.08720	9.26287	290.90	1.25389	1.19106	1.25389	23	7.35800	832.10000	3.67900				
STEAM CONVERTOR, <300,000	CT	9.51412	55.82359	8.43804	268.16	1.02927	0.98416	1.02927	12	6.50000	147.34000	3.25000				
FLASH TANK, 24 GAL.	CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000				
STEAM REG. VALVE 2"	CT	4.87513	216.35072	4.87513	326.92	0.67498	20.01256	0.67498	25	0.65000	1007.00000	0.65000				
COMD. METER, <300 #/HR.																
VALVES																
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500				
EQUIPMENT																
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000				
BASEBOARD RADIATION 10 FT	CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000				
FINNED RADIATOR, WALL 10 F	CT	0.89180	44.99303	0.44590	63.79	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000				
SOLAR																
EQUIPMENT																
SOLAR PANEL, 3' X 8'	CT	1.17390	105.28980	0.58695	130.04	0.00000	0.00000	0.00000	12	3.90000	349.80030	1.95000				
SOLAR STORAGE TANK, 1000GAL	CT	2.43204	342.07578	1.21602	393.34	0.00000	0.00000	0.00000	17	15.60000	2194.20000	7.80000				
PIPING SYSTEM																
PIPE/FITTINGS, PVC	TF	0.13402	0.60131	0.11567	3.58	0.01874	0.08407	0.01617	34	41.70530	669.12500	20.85265				
HEATING GENERATION																
EQUIPMENT																
BOILER GAS 250 KBTU/HR	CT	278.69517	564.25169	276.09517	6876.74	38.23717	43.43871	38.23717	23	65.00000	3169.40000	32.50000				
BOILER GAS 2000 KBTU/HR	CT	320.26446	1802.99832	309.18846	9031.15	42.71125	83.93657	42.71125	23	184.60000	15032.92000	46.15000				
BOILER GAS 10,000 KBTU/HR	CT	335.08504	6599.69757	320.16364	14151.68	44.06467	495.88927	44.06467	23	248.69000	38160.00000	62.17250				
BOILER COAL 40,000 KBTU/HR	CT	2579.5740	76330.60000	871.91386	129370.83	102.82001	0.00000	69.07669	23	20890.000	636000.00000	4160.00000				
REPAIR BOILER																
BOILER COAL 100,000 KBTU/H	CT	4438.6121	174665.36900	1290.9404	265260.54	123.77301	0.00000	79.55319	23	1050.4000	148400.00000	262.60000				
REPAIR BOILER																
BOILER OIL 250 KBTU/HR	CT	321.01919	470.20473	317.11919	7738.44	44.15446	30.29007	44.15446	15	1313.7800	276766.00000	328.44500				
BOILER OIL 2000 KBTU/HR	CT	361.92863	1419.28633	350.85263	9592.38	48.53628	30.29007	48.53628	23	65.00000	3169.40000	16.25000				
BOILER OIL 10,000 KBTU/HR	CT	374.06268	3674.43008	357.07308	12363.92	51.52103	33.78213	53.42103	23	248.69000	15032.92000	46.15000				
BOILER GAS/OIL 2000 KBTU/H	CT	332.18671	1867.16005	321.11071	9365.71	44.37809	32.00437	44.37809	23	184.60000	38160.00000	62.17250				
BOILER GAS/OIL 20000 KBTU	CT	383.09403	12383.19911	344.61603	20960.33	46.35937	936.94588	46.35937	23	651.30000	18689.92000	46.15000				
BOILER GAS/OIL 20000 KBTU	CT	1449.9743	3232.03593	1586.1243	35913.13	187.43746	112.03560	186.76635	9	364.00000	71020.00000	162.82500				
BOILER-PNEUMAT. COAL SPREAD.	CT	404.12101	37163.15183	2701.3571	124530.27	315.63489	112.56771	315.33389	15	104.0000	21200.00000	91.00000				
ASH HANDLING SYSTEM																
FUEL OIL EQUIPMENT	CT	6.63233	102.59422	3.31616	242.40	0.80690	0.35916	0.40345	12	2.60000	302.10000	1.30000				
CHEMICAL FEED SYSTEM	CT	5.51005	128.80452	4.97201	252.05	0.61991	0.00000	0.61991	12	3.25000	389.02000	1.62500				
FEED-WATER SUPPLY	CT	142.48871	912.51160	136.17574	4123.95	18.59733	0.00000	18.59733	12	28.60000	21200.00000	65.53333				
DEAERATOR	CT	181.01239	3635.80000	79.35870	7415.87	19.07312	0.00000	9.53656	15	260.00000	21200.00000	65.53333				

See NOTES on the last page of this tab for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings



COMPONENT DESCRIPTION	UN	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		By Resources				Washington				D.C. Total			
		Labor	Material	Equipment		Labor	Material	Equipment		Labor	Material	Equipment	
Zone: 8													
BLOCKOFF SYSTEM	CT	0.86086	48.78427	0.43043		66.93	0.00000	0.00000		12	0.00000	1.30000	
HOUSE FURN GAS 25KBTU/HR	CT	32.54717	269.13930	30.82545		1001.80	21.19029	4.06897		12	2.60000	147.34000	
HOUSE FURN GAS 100KBTU/HR	CT	36.01581	337.54492	32.57237		1143.36	25.35652	4.07250		12	10.40000	355.10000	
HOUSE FURN GAS 200KBTU/HR	CT	36.01581	812.30397	32.57237		1618.12	30.68755	4.07250		12	20.80000	471.70000	
HOUSE FURN OIL 25KBTU/HR	CT	41.44032	406.04746	39.71860		1430.40	30.09740	5.31232		12	20.80000	1786.10000	
HOUSE FURN OIL 100KBTU/HR	CT	44.88376	684.59640	41.44032		1691.54	32.82700	5.31232		12	20.80000	848.00000	
HOUSE FURN OIL 200KBTU/HR	CT	44.88376	803.07720	41.44032		1810.02	38.42985	5.31232		12	20.80000	1358.49600	
HOUSE FURN ELECT 25KBTU/HR	CT	18.82475	301.75412	17.10301		723.19	14.36630	2.15045		12	10.40000	601.02000	
HOUSE FURN ELECT 100KBTU	CT	22.26817	396.71437	18.82475		890.74	20.68747	2.15045		12	20.80000	751.27500	
HOUSE FURN ELECT 200KBTU/H	CT	22.26817	505.96874	18.82475		999.99	26.57766	2.15045		12	20.80000	954.00000	
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000		0.00	0.00000	0.00000		39	5.20000	175.96000	
FINNED RADIATOR, WALL 10 F	CT	0.89180	39.81201	0.44350		58.51	0.00000	0.00000		12	5.20000	232.14000	
EXPANSION TANK	CT	0.05949	0.00000	0.05949		1.35	0.00000	0.00000		12	0.00000	192.35000	
STEAM CONVERTOR, <300,000	CT	9.48014	75.08720	9.18582		289.16	1.19106	1.24311		25	7.35000	832.10000	
FLASH TANK, 24 GAL.	CT	9.51412	55.82359	8.43804		268.16	0.98416	1.02927		12	6.30000	147.34000	
STORAGE TANK DIM	CT	15.00502	21.30388	15.00502		1870.21	2.09784	2.09784		25	3.59395	346.62000	
IMO. FUR. GAS/OIL 500 MBU	CT	38.46908	1029.18862	28.63762		361.62	4.71767	7.38862		25	184.60000	16.25000	
IMO. FUR. GAS/OIL 2000 MBTU	CT	66.24823	2116.15853	56.20291		3586.91	155.79685	7.38862		25	184.60000	46.15000	
SURGE TANK, 1000 GAL	CT	1.56520	473.80410	0.78260		506.80	0.00000	0.00000		12	5.20000	1574.10000	
DIST. PIPING SYSTEM	TF	0.10761	0.05615	0.10761		2.50	0.01504	0.01504		39	10.74450	41.34000	
PIPE/FITTINGS, ST. & C.I.	TF	0.54360	4.12629	0.32156		15.74	0.01391	0.01391		23	5.55100	51.00720	
PIPE/FITTINGS, COPPER	TF	26.96377	861.66720	14.08792		1432.00	0.83340	0.16946		21	241.80000	8034.80000	
PIPE AND FITTINGS, PVC	TF	0.05990	72.08618	0.05990		232.20	0.06210	0.06210		25	91.00000	954.00000	
PIPE INSULATION, 1 1/2"	CT	0.72132	3.71512	0.72132		19.63	0.09461	0.09461		15	0.26000	17.91400	
GATE VALVE, 3/8" - 1"	CT	0.25695	16.52877	0.25695		22.36	0.02221	0.02221		15	0.57200	94.05380	
GATE VALVE, 2" - 3"	CT	1.07102	8.13252	1.07102		32.42	0.13322	0.13322		15	0.68900	17.91400	
DRAIN VALVE	CT	0.47347	6.69643	0.23674		16.48	0.00000	0.00000		12	1.43000	20.22480	
RADIATOR VALVE 1"	CT	9.43332	302.99219	4.71666		501.85	0.00000	0.00000		5	7.80000	250.53100	
PRESSURE REDUCER VALVE 2"	CT	4.41052	89.43297	4.41052		235.51	5.97739	0.19418		8	2.60000	151.41040	
STEAM TRAP, F & T, <1"	CT	7.74052	79.37317	7.74052		255.51	0.04831	0.04831		23	91.00000	954.00000	
PIPE INSULATION	TF	2.85366	126.45040	2.85366		191.26	0.51065	0.51065		12	4.19900	371.00000	
CIRCULATION PUMP, < 1 HP	CT	17.89411	484.59143	2.89031		527.13	6.07233	0.20487		12	4.19900	1272.00000	
CIRCULATION PUMP, 5 HP	CT	17.89411	412.32609	16.55641		813.68	11.89634	2.12772		15	15.60000	1908.00000	
COND. RCVR., 10 - 15 GAL.	CT												
COOLING GENERATION													
EQUIPMENT													
A/C DX PACKAGE 5T	CT	26.03546	0.00000	26.03546		590.48	0.00000	3.64000		93	8.38500	1855.00000	
A/C DX PACKAGE 20T	CT	66.01850	0.00000	66.01850		1497.30	0.00000	9.23000		93	20.41000	7950.00000	
A/C DX PACKAGE 50T	CT	84.61526	0.00000	84.61526		1919.07	0.00000	11.83000		93	47.71000	21200.00000	
A/C WINDOW 1T	CT	12.08789	0.00000	12.08789		274.15	0.00000	1.69000		46	5.98000	530.00000	
A/C WINDOW 2T	CT	12.08789	0.00000	12.08789		274.15	0.00000	1.69000		46	5.98000	530.00000	
A/C WINDOW 4T	CT	35.33384	0.00000	35.33384		801.37	0.00000	4.94000		46	6.50000	1484.00000	
A/C PAD MTD. 4T	CT	67.93587	1363.42500	65.60232		2896.74	0.00000	9.00869		15	28.41000	7950.00000	
A/C PAD MOUNTED 20 TON	CT	160.86197	0.00000	80.43099		3390.97	0.00000	11.24500		93	20.41000	10759.00000	
CHILLER-AIR COOL RECIP. 20T	CT	199.91517	0.00000	99.95758		4214.21	0.00000	13.97500		93	40.30000	19080.00000	
CHILLER-AIR COOL REC. 50T	CT	199.91517	0.00000	99.95758		4214.21	0.00000	13.97500		93	40.30000	19080.00000	
CHILLER-AIR COOL REC. 10T	CT	86.47493	0.00000	86.47493		1961.25	0.00000	12.09000		93	15.60000	3710.00000	
CHILLER-AIR COOL REC. 15T	CT	125.52813	0.00000	62.76407		2646.13	0.00000	8.77500		93	20.80000	6360.00000	
CHILLER-AIR COOL REC. 20T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILLER-WAT. COOL REC. 10T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILLER-WAT. COOL REC. 15T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILLER-WAT. COOL REC. 20T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILLER-WAT. COOL REC. 10T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILLER-WAT. COOL REC. 15T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILLER-WAT. COOL REC. 20T	CT	162.72165	0.00000	81.36083		3430.17	0.00000	11.37500		93	28.60000	8268.00000	
CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	118.55432		4998.25	0.00000	16.57500		93	62.40000	37789.00000	
CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	118.55432		4998.25	0.00000	16.57500		93	62.40000	37789.00000	
CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	118.55432		4998.25	0.00000	16.57500		93	62.40000	37789.00000	

See NOTES on the last page of this table for Explanation of Column Headings

ANNUAL MAINTENANCE AND REPAIR PLUS  
HIGH COST REPAIR AND REPLACEMENT COSTS

COMPONENT DESCRIPTION	Zone: 8	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		By Resources				Washington				labor			
		un	labor	material	equipment	D.C. Total	labor	material	equipment	vr	labor	material	equipment
CHILL. OPEN CENT. 300T		CT	618.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	93	97.50000	61771.50000	24.37500
CHILL. OBL. BNL. 300T		CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.25000	93	162.50000	127700.00000	24.37500
CHILL. OBL. BNL. 300T		CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	93	68.90000	41540.00000	17.82500
CHILL. OBL. BNL. 300T		CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	93	107.90000	67840.00000	26.97500
CHILL. ONE STG. ABS. 300T		CT	813.60825	0.00000	406.80413	17150.86	113.75000	0.00000	56.87500	93	178.10000	139720.00000	44.52500
CHILL. ONE STG. ABS. 300T		CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	93	106.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T		CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	93	167.70000	113420.00000	26.00000
CHILL. TWO STG. ABS. 300T		CT	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	93	114.40000	67840.00000	41.92500
AIR COOLED CONDENSER 5T		CT	16.73708	0.00000	8.34854	379.40	2.34000	0.00000	1.17000	93	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 50T		CT	16.73708	0.00000	8.34854	379.40	2.34000	0.00000	1.17000	93	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 100T		CT	29.75482	0.00000	14.87741	627.33	4.16000	0.00000	2.08000	70	31.20000	2438.00000	6.93333
COOLING TOWER 50T		CT	32.54433	0.00000	16.27217	686.03	4.50000	0.00000	2.27500	70	46.80000	10578.00000	11.70000
COOLING TOWER 100T		CT	101.35234	0.00000	50.67271	2136.31	14.17000	0.00000	7.08500	70	52.00000	10070.00000	13.00000
COOLING TOWER 300T		CT	118.08923	0.00000	59.47471	2469.33	16.51000	0.00000	8.25500	70	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T		CT	128.31763	0.00000	64.15882	2704.94	8.32000	0.00000	4.16000	70	36.40000	10038.00000	9.10000
EVAPORATIVE CONDENSER 300T		CT	59.51093	0.00000	29.75482	1234.46	13.65000	0.00000	6.82500	70	100.10000	31800.00000	25.02500
EXPANSION TANK		CT	22.31611	0.00000	11.15806	470.42	3.12000	0.00000	1.56000	70	182.00000	135.48000	1.25500
REFRIG. FAN COIL 1T		CT	0.05949	0.00000	0.05949	1.35	0.00832	0.00000	0.00832	39	3.47100	855.42000	1.30000
REFRIG. FAN COIL 3T		CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	70	2.60000	1051.52000	1.43000
REFRIG. FAN COIL 5T		CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	70	3.25000	1240.20000	1.62500
PIPE/FITTINGS ST.& C.I.		TF	1.03477	3.39863	0.60499	25.49	0.02450	0.01278	0.02450	23	10.74450	41.34000	5.37225
PIPE/FITTINGS COPPER		TF	0.03462	8.78569	0.55863	30.73	0.01155	0.00531	0.01155	23	5.55100	51.00720	120.90000
PIPE AND FITTINGS, PVC		TF	0.75332	3.61899	0.75332	20.30	0.10280	0.50597	0.10280	23	24.18000	8321.00000	0.68900
GATE VALVE, 3/8" - 1 1/2"		CT	0.27643	0.27643	0.27643	9.54	0.02213	0.02786	0.02213	13	0.68900	17.91400	0.57200
GATE VALVE, 2" - 3"		CT	0.25695	16.52877	0.25695	22.36	0.02213	0.05572	0.02213	13	0.57200	94.05380	0.57200
PIPE INSULATION		TF	1.07104	8.13252	1.07104	32.42	0.13322	0.70747	0.13322	13	0.68900	17.91400	0.68900
PIPE INSULATION		TF	7.76858	74.92995	7.76858	231.12	0.04831	0.19845	0.04831	23	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP		CT	2.83547	126.49060	2.83547	190.80	0.20205	0.51063	0.20205	12	1.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP		CT	6.63053	464.59143	4.04795	606.71	0.20487	6.07223	0.20487	12	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT													
MULTI-ZONE 6500 CFM		CT	56.09288	1422.22886	33.44953	2621.96	7.04892	68.11813	4.47821	17	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM		CT	57.10623	1851.20011	33.70287	3071.48	7.04892	83.33976	4.47821	17	42.90000	8050.70000	18.85000
MULTI-ZONE 25,000 CFM		CT	64.90169	3477.15002	37.63290	7851.86	7.81192	151.36028	4.85058	17	75.40000	15359.40000	26.32500
MULTI-ZONE 50,000 CFM		CT	72.29182	5164.58792	41.27227	1025.72	7.15000	53.21200	4.55000	70	26.00000	4240.00000	6.50000
MULTI-ZONE 2500 CFM		CT	51.11108	350.20415	32.34453	1480.97	6.92176	83.42271	4.41463	17	36.40000	5997.48000	9.10000
DUAL DUCT 6500 CFM		CT	51.18331	1422.22886	33.44953	2602.78	6.92176	83.42271	4.41463	17	42.90000	8050.70000	18.85000
DUAL DUCT 10,000 CFM		CT	56.15366	1851.79343	33.70287	3052.90	6.92176	149.36944	4.41463	17	42.90000	8050.70000	18.85000
DUAL DUCT 25,000 CFM		CT	63.99223	3462.91033	37.63290	7851.86	7.81192	171.63618	4.85058	17	75.40000	15359.40000	26.32500
DUAL DUCT 50,000 CFM		CT	72.29182	5164.58792	41.27227	1025.72	7.15000	53.21200	4.55000	70	26.00000	4240.00000	6.50000
3 DR. MULTI ZONE 6500 CFM		CT	55.48487	1422.22353	33.44953	2602.78	6.92176	83.42271	4.41463	17	42.90000	8050.70000	18.85000
3 DR. MULTI ZONE 10,000 CFM		CT	57.10623	1851.79343	33.70287	3052.90	6.92176	149.36944	4.41463	17	42.90000	8050.70000	18.85000
3 DR. MULTI ZONE 25,000 CFM		CT	64.90169	3477.15002	37.63290	7851.86	7.81192	151.36028	4.85058	17	75.40000	15359.40000	26.32500
3 DR. MULTI ZONE 50,000 CFM		CT	72.29182	5164.58792	41.27227	1025.72	7.15000	53.21200	4.55000	70	26.00000	4240.00000	6.50000
D.D. VARI. VOL. 6500 CFM		CT	55.58865	1511.79653	26.27430	2678.74	6.92176	83.42271	4.41463	17	42.90000	8050.70000	18.85000
D.D. VARI. VOL. 10000 CFM		CT	56.80467	1851.82290	26.27430	3176.43	6.92176	83.42271	4.41463	17	42.90000	8050.70000	18.85000
D.D. VARI. VOL. 25000 CFM		CT	65.00814	3710.41037	29.36135	5074.62	7.30326	169.08514	4.85058	17	83.20000	16960.00000	20.80000
D.D. VARI. VOL. 50000 CFM		CT	73.00361	5839.41513	31.99240	7363.90	7.30326	287.98080	4.85058	17	115.70000	29680.00000	28.92500
D.D. VARI. VOL. 100,000 CFM		CT	54.57530	2059.81147	27.89514	3235.87	7.80000	287.98080	4.85058	17	169.00000	48760.00000	42.25000
VARIABLE VOLUME 10000 CFM		CT	54.57530	1422.22886	50.57938	2647.21	6.92176	83.42271	4.41463	17	32.50000	5997.48000	8.12500
VARIABLE VOLUME 25000 CFM		CT	56.19666	1851.79343	33.24809	3052.90	6.92176	83.42271	4.41463	17	42.90000	8050.70000	18.85000
VARIABLE VOLUME 50000 CFM		CT	57.07727	3073.69231	26.32863	4191.89	5.77726	94.95314	3.27012	17	75.40000	15359.40000	26.32500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	UNIT	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (Q=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		labor	material	equipment	D.C. Total	labor	material	equipment	material
Zone: 8									
VARIABLE VOLUME 50000 CFM	CT	71.38225	5484.58797	41.13755	7006.75	7.66475	171.63618	5.17763	27305.60000
TERM. REHEAT 6500 CFM	CT	58.55309	1769.17731	33.51123	3017.03	6.81858	67.26674	4.34326	4279.22000
TERM. REHEAT 10000 CFM	CT	60.11829	2449.08740	33.90253	3728.68	6.81858	82.25393	4.34326	6181.92000
TERM. REHEAT 25000 CFM	CT	72.96422	5653.68873	39.11811	7200.21	7.19217	147.64339	4.71685	15274.60000
TERM. REHEAT 50000 CFM	CT	88.15794	8100.74059	44.92063	9961.80	7.56576	170.81998	5.09044	22853.60000
2 PIPE INDUCTION 6500 CFM	CT	58.55309	1769.17731	33.51123	3017.03	6.81858	67.26674	4.34326	4279.22000
2 PIPE INDUCTION 10000 CFM	CT	60.11829	2449.08740	33.90253	3728.68	7.19217	147.64339	4.71685	15274.60000
2 PIPE INDUCTION 25000 CFM	CT	72.96422	5653.68873	39.11811	7200.21	7.56576	170.81998	5.09044	22853.60000
2 PIPE INDUCTION 50000 CFM	CT	88.15794	8100.74059	44.92063	9961.80	7.19217	147.64339	4.71685	15274.60000
4 PIPE INDUCTION 6500 CFM	CT	51.17705	505.63439	32.56231	1606.19	7.02003	84.50320	4.55251	15274.60000
4 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.76	7.02003	84.50320	4.55251	15274.60000
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2232.62	7.41000	150.79560	4.87500	22853.60000
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	22853.60000
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	694.50000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	1364.22000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	1364.22000
SIN.ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	1908.00000
SIN.ZONE DRAW THRU 10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	22853.60000
SIN.ZONE DRAW THRU 25000CFM	CT	53.00077	1078.58061	34.86893	2232.62	7.41000	150.79560	4.87500	22853.60000
SIN.ZONE DRAW THRU 50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	22853.60000
SIN.ZONE DRAWTHRU 10000CFM	CT	50.83775	499.14650	49.66385	1648.39	6.77935	16.25626	5.26500	1364.22000
SIN.ZONE DRAWTHRU 25000CFM	CT	50.21125	380.60415	32.07941	1661.37	7.02000	53.21200	4.48500	1364.22000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	1364.22000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	1364.22000
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	1364.22000
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	1364.22000
GASFIRED RADIANT HTR 5000H	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	1364.22000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	828.92000
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	2994.50000
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	3989.00000
HEAT PUMP 5T	CT	30.64194	177.94783	30.39826	872.13	4.21589	9.22807	4.21589	17735.00000
DUCTCOIL 1-ROW H.M.12X24	CT	18.59676	0.00000	9.29838	392.02	2.60000	0.00000	1.30000	1272.00000
VENTILATION SYSTEM	CT								
FIXTURES	CT								
FORCE DRAFT FAN 10,000 CFM	CT	34.97881	597.90652	31.93876	1381.50	4.32366	21.44301	4.32366	2851.40000
TWO DRAFT FAN 10000 CFM	CT	35.50017	617.58331	32.19944	1411.96	4.39655	22.45635	4.36011	2929.80000
EXHAUST SYSTEM	CT								
EQUIPMENT	CT								
EXHAUST FAN <200 CFM	CT	3.45437	12.79563	3.45437	91.14	0.40503	0.79188	0.40503	41.58380
EXHAUST FAN 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	296.80000
EXHAUST FAN 10,000 CFM	CT	36.01372	472.32704	32.32034	1277.30	4.41164	22.75238	4.41164	1805.18000
EXHAUST FAN 25,000 CFM	CT	56.01372	1199.26184	16.89211	1954.86	4.41164	69.05414	2.20582	4112.80000
EXHAUST FAN 50,000 CFM	CT	37.12847	1444.76844	32.99903	2272.35	4.41164	72.37081	2.37081	5406.00000
EXHAUST FAN, 5000 CFM	CT	10.88321	149.09696	10.03360	393.21	1.32964	0.76137	1.30682	1632.40000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	689.00000
FIXTURES	CT								
METAL FLUE/CHIMNEY	LF	2.73910	37.33002	1.36955	95.07	0.00000	0.00000	0.00000	124.02000
SPECIAL SYSTEM	CT								
HUMIDITY CONTROL SYSTEM	CT								
ROOM HUMIDIFIER, FLOOR TYPE	CT	4.68075	56.82321	4.68075	162.98	0.04942	0.60447	0.04942	169.60000
CONTROLS/INSTRUMENT	CT								

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 55	
COMPONENT DESCRIPTION	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS													
	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (P=10%)					Annual Maintenance and Repair							Replacement and High Costs Tasks	
	By Resources			Washington										
	labor	material	equipment	D.C. Total		labor	material	equipment	yr	labor	material	equipment		
Zone: 8	um													
DEVICES														
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000		
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	46	0.78000	100.26540	0.78000		
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	70	0.78000	100.04280	0.78000		
RADIATION SENSOR	CT	9.25262	6.78612	9.25262	216.64	1.28401	0.00000	1.28401	23	0.78000	77.11500	0.78000		
WIND VELOCITY SENSOR	CT	9.12205	15.43821	9.12205	222.33	1.23837	0.00000	1.23837	11	0.78000	45.52700	0.78000		
PRESSURE SENSOR	CT	9.25262	5.13040	9.25262	214.98	1.28401	0.00000	1.28401	23	0.78000	58.50000	0.78000		
DAMPER CONTROLLER/ELECT.	CT	9.50105	44.77557	9.50105	260.26	1.27166	0.00000	1.27166	17	2.60000	287.20700	2.60000		
SIMPLEX AIR COMP., 1 HP	CT	26.66572	26.52885	10.58644	605.45	3.72812	3.70898	2.59856	28	3.67900	6103.82980	1.83950		
See NOTES on the last page of this table for Explanation of Column Headings														

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

COMPONENT DESCRIPTION	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10X)			ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
		By Resources			Annual Maintenance and Repair					Replacement and High Costs Tasks				
		labor	material	equipment	labor	material	equipment	yr	labor	material	equipment	labor	material	equipment
Zone: 9														
HVAC														
NATURAL GAS SYSTEM														
EQUIPMENT														
GAS METER	CT	0.06689	16.90647	0.06689					0.00000	0.00000	0.00000	16	0.39000	98.58000
PIPING SYSTEM														
PIPE/FITTINGS, STEEL/IRON	TF	4.67407	8.35929	2.35004					0.00000	1.16871	0.00000	58	1074.4500	1929.20000
PRESS. REDUCING VALVE, 5"	CT	0.23622	7.11684	0.23622					0.01947	0.00000	0.01947	11	0.26000	19.08000
PRESS. REDUCING VALVE, 2"	CT	0.37200	120.59090	0.25562					0.01947	0.00000	0.01947	11	0.62400	323.30000
FUEL OIL SYSTEM														
STORAGE SYSTEMS														
OIL STORAGE TANK, 275 GAL.	CT	0.20800	13.14400	0.10400					0.00000	0.00000	0.00000	23	2.60000	164.30000
OIL FILTER	CT	0.74387	24.26162	0.74387					0.10400	3.39200	0.10400	30	0.65000	19.60000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525					0.03258	0.00000	0.03258	20	1.30000	620.10000
DISTRIBUTION SYSTEM														
PIPE/FITTINGS, COPPER	TF	7.55174	132.26681	3.82563					0.14701	0.27326	0.08046	19	55.51000	1113.00000
LPG SYSTEM														
STORAGE SYSTEM														
LPG STORAGE TANK, 1000 GAL	CT	0.41600	125.92800	0.20800					0.00000	0.00000	0.00000	23	5.20000	1574.10000
DISTRIBUTION SYSTEM														
PIPE/FITTINGS, STEEL/IRON	TF	4.64807	8.34572	2.32404					0.64984	1.16681	0.32492	58	1074.4500	1929.20000
STEAM, CENTRAL														
PRESS. RED. / REG. SYSTEM														
STEAM CONVERTOR, <300,000	CT	11.04947	98.37197	10.65766					1.43526	1.36360	1.43526	20	7.35800	832.10000
FLASH TANK, 24 GAL.	CT	10.74579	64.31745	9.50201					1.15458	1.10875	1.15458	10	6.50000	147.34000
STEAM REG. VALVE 2"	CT	10.81782	347.46144	5.40891					0.00000	0.00000	0.00000	23	7.80000	250.53100
COND. METER, <300 #/HR.	CT	4.82034	237.99719	4.82034					0.66666	22.01118	0.66666	23	0.65000	1007.00000
VALVES														
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000					0.00000	0.00000	0.00000	34	1.43000	20.22480
EQUIPMENT														
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000					0.00000	0.00000	0.00000	34	5.20000	175.96000
BASEBOARD RADIATION 10 FT	CT	1.07900	48.16905	0.53950					0.00000	0.00000	0.00000	14	5.20000	232.14000
FINNED RADIATOR, WALL 10 F	CT	1.07900	54.43763	0.53950					0.00000	0.00000	0.00000	14	5.20000	262.35000
SOLAR														
EQUIPMENT														
SOLAR PANEL, 3' X 8'	CT	1.29129	115.81878	0.64565					0.00000	0.00000	0.00000	12	3.90000	349.80000
SOLAR STORAGE TANK, 1000GAL	CT	2.67540	376.30530	1.33770					0.00000	0.00000	0.00000	15	15.60000	2194.20000
PIPING SYSTEM														
PIPE/FITTINGS, PVC	TF	0.12839	0.54725	0.11171					0.01795	0.07651	0.01562	36	41.70530	669.12500
HEATING GENERATION														
EQUIPMENT														
BOILER GAS 250 KBTU/HR	CT	280.27650	688.15017	276.81525					38.21743	49.01967	38.21743	20	65.00000	3169.40000
BOILER GAS 2000 KBTU/HR	CT	325.11649	2278.50496	310.37157					42.70567	94.72066	42.70567	20	184.60000	15032.92000
BOILER GAS 10,000 KBTU/HR	CT	341.57344	8066.63942	321.70933					44.05233	559.60062	44.05233	20	248.60000	38160.90000
BOILER COAL 40,000 KBTU/HR	CT	3165.8208	98527.00000	989.74414					102.43307	0.00000	68.81618	20	20800.000	63600.00000
REPAIR BOILER														
BOILER COAL 100,000 KBTU/HR	CT	5584.9790	226763.94500	1521.1004					123.30756	0.00000	79.25343	20	1050.4000	148400.00000
REPAIR BOILER														
BOILER OIL 250 KBTU/HR	CT	323.68845	582.02915	318.49678					44.28685	74.18170	44.28685	20	65.00000	3169.40000
BOILER OIL 2000 KBTU/HR	CT	308.07829	1957.66103	301.70008					43.68378	94.19170	43.68378	20	184.60000	15032.92000
BOILER OIL 10,000 KBTU/HR	CT	337.01354	4356.71427	328.51419					53.35022	58.12643	53.35022	20	248.60000	38160.90000
BOILER GAS/OIL 2000 KBTU/HR	CT	400.88732	2410.23280	322.27042					44.38974	58.68584	44.38974	20	184.60000	15032.92000
BOILER GAS/OIL 20000 KBTU/HR	CT	1450.0993	15126.24355	348.66473					46.35012	107.32375	46.35012	20	651.30000	71020.00000
BOILER-PNEUMAT. COAL SPREAD.	CT	4499.01714	4194.26539	1367.0942					184.32044	144.34642	183.56036	8	364.00000	11236.00000
ASH HANDLING SYSTEM	CT	4494.6521	4499.01714	2783.6947					314.10288	128.48714	313.75929	14	104.00000	212000.00000
FUEL OIL EQUIPMENT														
CHEMICAL FEED SYSTEM	CT	5.64421	7.02142	3.51071					0.84255	0.40465	0.42127	10	2.60000	302.10000
FEED-WATER SUPPLY	CT	142.95827	1054.77120	135.66146					18.45665	0.00000	0.61522	10	28.60000	389.02000
DEAERATOR	CT	189.71154	4399.00000	81.56827					18.98073	0.00000	18.45665	14	260.00000	2756.00000

See NOTES on the last page of this table for Explanation of Column Headings



Zone: 9	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS											
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks							
		um	labor	material	equipment	Washington	D.C. Total	labor	material	equipment	yr	labor	material	equipment	labor	material	equipment
	CHILL - OPEN CENT. 300T	CT	618.34227	0.00000	309.17116	13034.66	13034.66	86.45000	0.00000	43.22500	91	97.50000	61771.50000	24.37500			
	CHILL - OPEN CENT. 900T	CT	237.08669	0.00000	137.55435	4998.29	4998.29	33.35000	0.00000	16.57500	91	162.50000	127200.00000	40.62500			
	CHILL - DBL. BMOL. HERM. 100T	CT	274.30221	0.00000	137.12111	5782.29	5782.29	38.35000	0.00000	19.17500	91	68.90000	41340.00000	17.22500			
	CHILL - DBL. BMOL. HERM. 300T	CT	274.30221	0.00000	137.12111	5782.29	5782.29	38.35000	0.00000	19.17500	91	178.90000	139920.00000	44.57500			
	CHILL - ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.84	17150.84	13.75000	0.00000	56.37500	91	65.00000	37160.00000	16.25000			
	CHILL - ONE STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2328.33	2328.33	16.77000	0.00000	8.38500	91	102.00000	11420.00000	26.00000			
	CHILL - ONE STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2328.33	2328.33	16.77000	0.00000	8.38500	91	167.70000	11420.00000	41.92500			
	CHILL - TWO STG. ABS. 300T	CT	111.58056	0.00000	55.79028	2352.12	2352.12	15.60000	0.00000	7.80000	91	114.00000	12822.00000	28.55000			
	CHILL - TWO STG. ABS. 900T	CT	16.73708	0.00000	8.36854	379.60	379.60	2.34000	0.00000	2.34000	68	9.10000	821.50000	4.55000			
	AIR COOLED CONDENSER 5T	CT	29.75482	0.00000	14.87741	627.23	627.23	4.16000	0.00000	2.08000	68	31.20000	5294.70000	7.80000			
	AIR COOLED CONDENSER 50T	CT	32.54433	0.00000	16.27217	686.03	686.03	4.50000	0.00000	2.27500	68	52.00000	10070.00000	11.70000			
	AIR COOLED CONDENSER 100T	CT	101.35234	0.00000	50.67617	2136.51	2136.51	14.17000	0.00000	8.08500	68	128.70000	16377.00000	13.00000			
	COOLING TOWER 100T	CT	118.06943	0.00000	59.04471	2489.33	2489.33	16.51000	0.00000	8.25500	68	78.00000	43142.00000	32.17500			
	COOLING TOWER 300T	CT	128.31764	0.00000	64.15882	2704.94	2704.94	17.94000	0.00000	9.07000	68	100.10000	3688.80000	9.10000			
	EVAPORATIVE CONDENSER 20T	CT	59.50963	0.00000	29.75482	1254.46	1254.46	8.32000	0.00000	4.16000	68	36.40000	10038.20000	23.02500			
	EVAPORATIVE CONDENSER 300T	CT	97.63299	0.00000	48.81650	2058.10	2058.10	13.65000	0.00000	6.82500	68	182.00000	3180.00000	45.50000			
	EVAPORATIVE TANK	CT	22.31611	0.00000	11.15806	470.42	470.42	3.12000	0.00000	1.56000	34	3.47100	135.68000	1.73550			
	EXPANSION TANK	CT	0.04898	0.00000	0.04898	1.56	1.56	0.00964	0.00000	0.00964	34	2.60000	855.42000	1.30000			
	REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	105.44	0.65000	0.00000	0.65000	68	2.60000	1051.52000	1.43000			
	REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	105.44	0.65000	0.00000	0.65000	68	3.25000	1240.20000	1.62500			
	REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	105.44	0.65000	0.00000	0.65000	68	3.25000	1240.20000	1.62500			
	PIPE/FITTINGS STEEL & C.I.	TF	1.34316	4.50649	0.77101	33.14	33.14	0.02780	0.01451	0.02780	20	10.74450	41.34000	5.37225			
	PIPE/FITTINGS COPPER	TF	1.26416	10.62732	0.67023	37.05	37.05	0.01319	0.00606	0.01319	20	5.55100	51.00720	2.77550			
	PIPE AND FITTINGS, PVC	TF	0.52417	3.34291	0.48717	18.97	18.97	0.09407	0.07296	0.09407	30	24.18000	8321.00000	120.90000			
	GATE VALVE, 3/8" - 1 1/2"	CT	0.32461	0.32461	0.32461	11.28	11.28	0.02526	0.03180	0.02526	14	0.68900	17.91400	0.68900			
	GATE VALVE, 2"-3"	CT	0.30001	0.30001	0.30001	26.76	26.76	0.02535	0.06360	0.02535	14	0.57200	94.05360	0.57200			
	DRAIN VALVE	CT	1.21468	0.98752	1.21468	37.54	37.54	0.19884	0.87665	0.19884	14	0.68900	17.91400	0.68900			
	PIPE INSULATION	TF	10.53086	92.84635	10.53086	331.71	331.71	0.07820	0.45617	0.07820	20	91.00000	901.00000	91.00000			
	CIRCULATOR PUMP < 1 HP	CT	5.35316	142.84635	3.13516	216.95	216.95	0.21366	0.34004	0.21366	10	4.19000	371.00000	4.19000			
	5 TON CHILLER ACH RECIP	CT	7.52106	555.47233	4.53600	696.50	696.50	0.21684	6.80566	0.21684	18	15.60000	1272.00000	7.80000			
	HEAT/COOL GENERATION EQUIPMENT	CT	55.67753	1338.04242	33.38492	2529.47	2529.47	7.06312	68.25483	4.48724	18	36.40000	5997.48000	9.10000			
	MULTI-ZONE 6500 CFM	CT	56.59658	1738.07891	33.61519	2948.19	2948.19	7.06312	83.50736	4.48724	18	42.90000	8050.70000	10.12500			
	MULTI-ZONE 10,000 CFM	CT	63.93808	3261.21674	37.43546	4626.32	4626.32	7.44536	151.44370	4.84019	18	75.40000	15359.40000	18.85000			
	MULTI-ZONE 25,000 CFM	CT	70.90916	5099.28597	41.22892	6612.33	6612.33	7.82206	171.97497	5.32324	18	102.30000	2705.40000	26.32500			
	MULTI-ZONE 50,000 CFM	CT	51.14109	380.80415	32.54433	1480.97	1480.97	6.93569	53.21200	4.23333	18	36.40000	5997.48000	9.10000			
	DUAL DUCT 6500 CFM	CT	54.76611	1338.04242	32.92921	2529.47	2529.47	6.93569	68.25483	4.48724	18	36.40000	5997.48000	9.10000			
	DUAL DUCT 10,000 CFM	CT	55.68716	1738.07891	33.15948	2929.57	2929.57	6.93569	83.50736	4.48724	18	42.90000	8050.70000	10.12500			
	DUAL DUCT 25,000 CFM	CT	63.93808	3261.21674	37.43546	4626.32	4626.32	7.44536	151.44370	4.84019	18	75.40000	15359.40000	18.85000			
	DUAL DUCT 50,000 CFM	CT	70.90916	5099.28597	41.22892	6612.33	6612.33	7.82206	171.97497	5.32324	18	102.30000	2705.40000	26.32500			
	3 DX MULTI ZONE 6500 CFM	CT	56.59658	1738.07891	33.61519	2948.19	2948.19	7.06312	83.50736	4.48724	18	36.40000	5997.48000	9.10000			
	3 DX MULTI ZONE 10,000 CFM	CT	63.93808	3261.21674	37.43546	4626.32	4626.32	7.44536	151.44370	4.84019	18	75.40000	15359.40000	18.85000			
	3 DX MULTI ZONE 25,000 CFM	CT	70.90916	5099.28597	41.22892	6612.33	6612.33	7.82206	171.97497	5.32324	18	102.30000	2705.40000	26.32500			
	3 DX MULTI ZONE 50,000 CFM	CT	51.14109	380.80415	32.54433	1480.97	1480.97	6.93569	53.21200	4.23333	18	36.40000	5997.48000	9.10000			
	D.D. VARI. VOL. 10000 CFM	CT	55.13453	1419.72139	31.29421	2577.27	2577.27	6.93569	68.25483	4.48724	18	36.40000	5997.48000	9.10000			
	D.D. VARI. VOL. 25000 CFM	CT	56.23979	1859.58404	26.46201	3039.82	3039.82	6.93569	83.50736	4.48724	18	36.40000	5997.48000	9.10000			
	D.D. VARI. VOL. 50000 CFM	CT	57.17113	3471.71966	26.18569	4814.19	4814.19	6.93569	149.38451	3.46785	18	36.40000	5997.48000	9.10000			
	D.D. VARI. VOL. 100,000 CFM	CT	55.79028	5420.39665	31.63704	6913.90	6913.90	6.93569	287.98080	3.85012	18	115.70000	29680.00000	20.80000			
	VARIABLE VOLUME 6500 CFM	CT	54.21348	2059.81147	27.89514	3235.87	3235.87	6.93569	149.38451	3.46785	18	36.40000	5997.48000	9.10000			
	VARIABLE VOLUME 10000 CFM	CT	55.68716	1738.07891	33.15948	2929.57	2929.57	6.93569	83.50736	4.48724	18	36.40000	5997.48000	9.10000			
	VARIABLE VOLUME 25000 CFM	CT	52.08966	2856.94020	26.10804	3955.19	3955.19	5.78887	95.14208	3.27671	18	75.40000	15359.40000	18.85000			

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION	Zone: 9	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C@10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources				Annual Maintenance and Repair			
		labor	material	equipment	D.C. Total	labor	material	equipment	YR
VARIABLE VOLUME 50000 CFM	CT	69.99775	5099.28597	40.83850	6593.53	7.78024	171.97697	5.18808	18
TERM. REHEAT 6500 CFM	CT	97.40381	1897.07384	33.66268	3161.98	6.80075	67.13980	12.33024	12
TERM. REHEAT 10000 CFM	CT	61.12553	2633.78427	34.09311	3933.61	6.80075	82.06115	4.33024	12
TERM. REHEAT 25000 CFM	CT	74.97710	6111.76135	39.55129	7698.88	7.17270	170.89343	5.07414	12
TERM. REHEAT 50000 CFM	CT	91.41124	8789.15929	45.65512	10715.95	7.54465	170.89343	5.07414	12
2 PIPE INDUCTION 6500 CFM	CT	59.40381	1897.07384	33.66268	3161.98	6.80075	82.06115	4.33024	12
2 PIPE INDUCTION 10000 CFM	CT	61.12553	2633.78427	34.09311	3933.61	6.80075	82.06115	4.33024	12
2 PIPE INDUCTION 25000 CFM	CT	74.97710	6111.76135	39.55129	7698.88	7.17270	170.89343	5.07414	12
2 PIPE INDUCTION 50000 CFM	CT	91.41124	8789.15929	45.65512	10715.95	7.54465	170.89343	5.07414	12
4 PIPE INDUCTION 6500 CFM	CT	51.33196	507.78797	32.63976	1612.18	7.17270	84.50320	4.48500	68
4 PIPE INDUCTION 10000 CFM	CT	51.33196	507.78797	32.63976	1612.18	7.17270	84.50320	4.48500	68
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.84893	2232.62	7.41000	150.79560	4.87500	68
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	68
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68
SIN.ZONE DRAW THRU 6500CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68
SIN.ZONE DRAW THRU 10000CFM	CT	50.21125	492.51078	32.07941	1573.28	7.02000	68.83760	4.48500	68
SIN.ZONE DRAW THRU 25000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	68
SIN.ZONE DRAW THRU 50000CFM	CT	53.00077	1078.58061	34.84893	2232.62	7.41000	150.79560	4.87500	68
SIN.ZONE DRAWTHRU 1000CFM	CT	50.46951	531.50106	49.17822	1672.02	6.69504	15.42682	6.69504	12
SIN.ZONE DRAWTHRU 2500CFM	CT	50.21125	380.60415	32.07941	1461.37	6.69504	15.42682	6.69504	12
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68
GASIFIED RADIANT HTR 5000H	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	91
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	91
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	91
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	91
HEAT PUMP 1T	CT	30.62675	167.77183	30.62675	861.68	4.21996	9.22907	4.21996	24
DUCT COIL 1-ROW H.W.12X24	CT	18.59676	0.00000	18.59676	392.02	2.60000	0.00000	2.60000	30
VENTILATION SYSTEM	CT	35.31546	642.04622	31.97121	1432.30	4.31402	21.39520	4.31402	15
FIXTURES	CT	36.01372	665.20623	32.32034	1470.18	4.41164	22.75338	4.31683	15
FORCE DRAFT FAN 10,000 CFM	CT								
THD DRAFT FAN 10000 CFM	CT								
EXHAUST SYSTEM	CT								
EQUIPMENT	CT								
EXHAUST FAN <200 CFM	CT	10.00740	16.439871	4.00240	107.27	0.46529	1.10031	0.44529	16
EXHAUST FAN, 1000 CFM	CT	10.07102	41.74397	9.76656	268.78	1.32389	0.92116	1.32389	20
EXHAUST FAN, 10,000 CFM	CT	36.88935	537.86719	32.44459	1160.32	4.03320	22.83398	4.34749	14
EXHAUST FAN 25,000 CFM	CT	36.88935	1348.23289	32.44459	2161.36	4.03320	22.83398	4.34749	14
EXHAUST FAN 50,000 CFM	CT	38.23810	1643.69523	32.44459	2561.35	4.03320	22.83398	4.34749	14
EXHAUST FAN, 5000 CFM	CT	10.76881	136.03776	9.98180	57.76	1.33110	0.76137	1.30828	24
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.35288	0.00000	0.35288	91
FIXTURES	CT								
METAL FLUE/CHIMNEY	CT								
SPECIAL SYSTEM	CT								
HUMIDITY CONTROL SYSTEM	CT								
ROOM HUMIDIFIER, FLOOR TYPE	CT								
CONTROLS/INSTRUMENT	CT								
See NOTES on the last page of this table for Explanation of Column Headings									



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)															PAGE 60
Zone: 9	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10%)													
		By Resources						Washington							
		Labor			Material			Equipment			D.C. Total				
		unit													
	DEVICES														
	THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	9.23749	9.23749	231.43							
	HUMIDITY SENSOR	CT	9.23749	0.00000	9.23749	9.23749	9.23749	210.89							
	FLOW SENSOR	CT	9.23749	0.00000	9.23749	9.23749	9.23749	210.89							
	RADIATION SENSOR	CT	9.23749	6.16920	9.23749	9.23749	9.23749	216.11							
	WIND VELOCITY SENSOR	CT	9.12621	15.07399	9.12621	9.12621	9.12621	222.06							
	PRESSURE SENSOR	CT	9.23749	8.66400	9.23749	9.23749	9.23749	214.61							
	DAMPER CONTROLLER/ELECT.	CT	9.48359	40.69723	9.48359	9.48359	9.48359	255.76							
	SIMPLEX AIR COMPRESSOR 1 HP	CT	26.15338	26.01945	18.33028	18.33028	18.33028	594.14							
See NOTES on the last page of this table for Explanation of Column Headings															
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EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE 61
Zone: 10	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS								
		By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks				
		labor	material	equipment	Washington D.C. Total	labor	material	equipment	yr	labor	material	equipment		
HVAC	NATURAL GAS SYSTEM													
	EQUIPMENT													
	GAS METER	CT 0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000		
	PIPING SYSTEM	TF 5.14477	9.19748	2.58811	117.70	0.71929	1.28589	0.36184	54	1074.4500	1929.20000	537.22500		
	PIPE/FITTINGS, STEEL/IRON	CT 0.22490	7.30192	0.22490	12.40	0.01753	0.00000	0.01753	10	0.26000	19.08000	0.26000		
	PRESS. REDUCING VALVE, 5"	CT 0.36420	123.72691	0.24480	131.60	0.01753	0.00000	0.01753	10	0.62400	323.30000	0.31200		
	PRESS. REDUCING VALVE, 2"													
	FUEL OIL SYSTEM													
	STORAGE SYSTEMS													
	OIL STORAGE TANK, 275 GAL.	CT 0.25168	15.90424	0.12584	21.21	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000		
	OIL FILTER	CT 0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000		
	FUEL LEVEL METER	CT 0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000		
	DISTRIBUTION SYSTEM													
	PIPE/FITTINGS, COPPER	TF 9.01536	159.85838	4.55902	350.07	0.16072	0.30007	0.08754	18	55.51000	1113.00000	27.75500		
	LPG SYSTEM													
STORAGE SYSTEM														
LPG STORAGE TANK, 1000 GAL	CT 0.50336	152.37268	0.25168	162.98	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000			
DISTRIBUTION SYSTEM														
PIPE/FITTINGS, STEEL/IRON	TF 5.11331	9.18106	2.55665	116.97	0.71489	1.28360	0.35744	54	1074.4500	1929.20000	537.22500			
STEAM CENTRAL														
PRESS. RED./REG. SYSTEM	CT 13.41198	129.67927	12.89067	432.19	1.72935	1.64565	1.72935	18	7.35800	832.10000	3.67900			
STEAM CONVERTOR, <300,000	CT 15.23362	375.11	1.68695	375.11	1.38130	1.37028	1.38130	9	13.00000	294.68000	6.50000			
FLASH TANK, 24 GAL.	CT 12.45036	399.89758	6.22518	662.35	0.00000	0.00000	0.00000	22	0.65000	250.53100	3.90000			
STEAM REG. VALVE 2"	CT 4.85836	270.65224	4.85836	380.84	0.67045	24.21142	0.67045	22	0.65000	1007.00000	0.65000			
COMP. METER, <300 #/HR.														
VALVES														
RADIATOR VALVE 1"	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500			
EQUIPMENT														
CAST IRON RADIATOR 10 SECT	CT 0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000			
BASEBOARD RADIATION 10 FT	CT 1.72172	76.86155	0.86086	113.16	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000			
FINNED RADIATOR, WALL 10 F	CT 1.72172	86.86409	0.86086	123.16	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000			
SOLAR														
EQUIPMENT														
SOLAR PANEL, 3' X 8'	CT 1.45470	130.47540	0.72735	161.14	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000			
SOLAR STORAGE TANK, 1000GAL	CT 2.94216	413.82612	1.47108	475.85	0.00000	0.00000	0.00000	14	15.60000	2194.20000	7.80000			
PIPING SYSTEM														
PIPE/FITTINGS, PVC	TF 0.06552	0.00605	0.06552	1.49	0.00916	0.00085	0.00916	38	41.70530	669.12500	20.85265			
HEATING GENERATION														
EQUIPMENT														
BOILER GAS 250 KBTU/HR	CT 282.25616	862.55123	277.65091	7249.38	38.17432	57.80377	38.17432	18	65.00000	3169.40000	32.50000			
BOILER GAS 2000 KBTU/HR	CT 330.64546	299.04851	311.02709	10365.33	42.57020	111.69417	42.57020	18	184.60000	15032.92000	46.15000			
BOILER GAS 10,000 KBTU/HR	CT 349.45759	10127.11917	323.02806	17968.24	43.93063	659.87853	43.93063	18	248.69000	38166.00000	62.17250			
BOILER COAL 40,000 KBTU/HR	CT 3940.0943	127384.44000	1145.1428	207801.94	101.91804	0.00000	68.46908	18	20800.000	636000.00000	4160.0000			
REPAIR BOILER														
BOILER COAL 100,000 KBTU/H	CT 7102.1500	294798.94260	1825.4290	438990.20	122.68824	0.00000	78.85419	12	1050.4000	1590000.00000	262.60000			
REPAIR BOILER														
BOILER OIL 250 KBTU/HR	CT 327.73823	737.40319	320.83035	8148.40	44.53314	40.30691	44.53314	18	65.00000	3169.40000	32.50000			
BOILER OIL 2000 KBTU/HR	CT 372.66015	2478.46397	335.04178	10807.62	48.44425	40.30691	48.44425	18	184.60000	15032.92000	46.15000			
BOILER OIL 10,000 KBTU/HR	CT 316.37854	5728.80851	380.04701	15037.63	53.28638	44.95379	53.28638	18	248.69000	38166.00000	62.17250			
BOILER GAS/OIL 2000 KBTU/H	CT 343.63326	3143.33423	324.07489	10875.52	44.39141	69.20208	44.39141	18	184.60000	18489.92000	46.85200			
BOILER GAS/OIL 20000 KBTU	CT 424.00123	18981.33411	354.78432	28376.19	46.37642	1266.70139	46.37642	18	651.30000	71020.92000	162.83500			
BOILER GAS/OIL 20000 KBTU	CT 1449.05119	4862.98108	353.5658	5717.51	181.95241	166.99201	180.95254	7	364.00000	11236.00000	91.00000			
BOILER-PNEUMAT. COAL SPREAD.	CT 5450.8015	71246.29793	3065.0084	191153.19	308.46677	147.69992	308.21526	12	10400.000	21200.00000	2600.0000			
ASH HANDLING SYSTEM														
FUEL OIL EQUIPMENT	CT 7.98302	147.55041	3.99151	315.63	0.43771	0.52862	0.43771	6	5.20000	404.20000	2.60000			
CHEMICAL FEED SYSTEM	CT 5.88653	185.13462	5.11319	316.17	0.00000	0.00000	0.00000	9	5.20000	378.04000	3.25000			
FEED-WATER SUPPLY	CT 143.80639	1311.58040	134.73256	4544.97	0.00000	0.00000	0.00000	9	57.20000	5512.00000	19.06667			
DEAERATOR	CT 219.48648	7019.32000	88.22174	11577.23	18.65063	0.00000	9.32531	12	260.00000	21200.00000	65.00000			

See NOTES on the last page of this table for Explanation of Column Headings

See NOTES on the last page of this table for Explanation of Column Headings

Zone: 10	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				REPLACEMENT AND HIGH COSTS TASKS			
		BY Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr.	labor	material	equipment	
Zone: 10	BLOWOFF SYSTEM 25KBTU/HR	1.23746	70.11911	0.61867	96.20	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000	
	HOUSE FURN. GAS 100KBTU/HR	36.53064	392.02227	31.78598	1160.50	0.33193	31.18068	0.00000	9	20.80000	710.40000	10.40000	
	HOUSE FURN. GAS 200KBTU/HR	39.51111	491.42264	34.21773	1365.03	0.33712	37.32070	0.33712	9	41.60000	943.40000	20.80000	
	HOUSE FURN. OIL 25KBTU/HR	39.51111	175.17271	24.21773	2048.78	0.33712	45.61177	0.33712	9	41.60000	3572.20000	10.40000	
	HOUSE FURN. OIL 100KBTU/HR	42.94746	170.17271	24.21773	1686.54	0.33712	42.20650	0.33712	9	20.80000	1696.00000	10.40000	
	HOUSE FURN. OIL 200KBTU/HR	47.89682	192.07347	24.21773	2052.36	0.33712	48.51603	0.33712	9	41.60000	2716.99200	20.80000	
	HOUSE FURN. ELECT. 25KBTU/HR	47.89682	1165.77241	42.94746	2234.23	0.33712	58.52652	0.33712	9	41.60000	1202.00000	20.80000	
	HOUSE FURN. ELECT. 100KBTU	21.05941	437.26622	18.53473	906.29	0.42788	21.14487	0.42788	9	20.80000	1202.00000	20.80000	
	HOUSE FURN. ELECT. 200KBTU/H	25.97877	575.31852	21.05941	1148.68	0.42788	30.44861	0.42788	9	41.60000	1502.55000	20.80000	
	CAST IRON RADIATOR 10 SECT	0.00000	733.80408	0.00000	1307.16	0.00000	0.00000	0.00000	30	5.20000	1908.00000	2.60000	
	BASEBOARD RADIATOR, WALL 10 F	1.72172	76.84155	0.86086	113.16	0.00000	0.00000	0.00000	12	5.20000	175.96000	2.60000	
	FINNED RADIATOR, WALL 10 F	0.06342	0.00000	0.00000	123.16	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000	
	STEAM CONVERTOR, <300,000	13.20369	129.67927	12.68477	427.53	0.01166	0.00000	0.00000	12	5.20000	252.35000	2.60000	
	FLASH TANK, 24 GAL.	17.25114	79.92016	11.66095	375.11	1.38130	0.00000	0.00000	18	7.35800	135.68000	1.73550	
	STORAGE TANK, DM.	40.51593	24.49289	17.25114	415.75	3.42433	1.37028	2.41187	36	13.00000	832.10000	3.67900	
	IND. FURN. GAS/OIL 500 MBTU	70.77591	1240.21048	59.23188	2122.96	4.78440	81.58425	3.66697	22	65.00000	6784.62000	1.79598	
	IND. FURN. GAS/OIL 2000 MBTU	1.93960	2547.11038	29.37395	4109.42	7.39484	169.61753	7.39484	22	184.00000	13780.00000	16.25000	
	SUMGE TANK, COOL. GAL.	0.00000	56.13930	0.96980	628.03	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000	
	OIST. PIPING SYSTEM	0.15667	0.09071	0.15667	3.59	0.02162	0.00128	0.02162	30	10.74450	41.34000	5.37225	
	PIPE/FITTINGS, ST. & C.I.	0.92981	7.20352	0.53652	27.12	0.02003	0.00920	0.00920	18	5.55100	51.00720	2.77550	
	PIPE/FITTINGS, COPPER	35.69831	115.53810	18.54778	1900.45	0.00000	0.98732	0.00000	22	91.80000	8034.80000	120.90000	
	PIPE AND FITTINGS, PVC	0.27380	95.13922	0.17382	306.72	0.07085	0.45553	0.07085	18	21.00000	954.00000	91.00000	
	GATE VALVE, 3/8" - 1 1/2"	0.39782	31.46343	0.39782	28.46	0.03910	0.03510	0.03910	12	0.26000	17.91400	0.26000	
	GATE VALVE, 2" - 3"	1.49481	13.16307	0.39782	40.46	0.03910	0.03510	0.03910	12	0.57200	94.05380	0.57200	
	DRAIN VALVE	0.60054	1.49481	0.39782	27.97	0.07085	0.00000	0.07085	12	0.48900	17.91400	0.48900	
	RADIATOR VALVE 1"	12.45036	9.64498	6.40277	662.35	0.00000	0.00000	0.00000	4	2.80000	250.53180	0.71500	
	PRESSURE REDUCER VALVE 2"	6.60768	399.89758	6.60768	261.26	0.00000	0.00000	0.00000	4	2.80000	250.53180	0.71500	
	STEAM TRAP F & T, <1"	13.56975	111.33118	13.56975	447.09	0.09438	5.86177	0.09438	18	91.00000	954.00000	2.60000	
	PIPE INSULATION	3.73052	180.86469	3.73052	265.48	0.14025	0.34503	0.14025	9	8.39800	242.04000	8.39800	
	CIRCULATION PUMP, < 1 HP	22.17634	665.03934	2.73137	746.45	0.14025	8.06839	0.14025	9	8.39800	2544.00000	4.19900	
	CIRCULATION PUMP, 5 HP	22.17634	744.54120	19.59376	1239.24	2.37832	15.77082	2.37832	12	15.60000	1908.00000	7.80000	
	COND. REVR. 10 - 15 GAL.												
	COOLING GENERATION EQUIPMENT												
	A/C DX PACKAGE 5T	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	117	8.38500	1855.00000	4.19250	
	A/C DX PACKAGE 20T	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	117	20.47100	7950.00000	11.92750	
	A/C DX PACKAGE 50T	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	117	27.47100	21200.00000	16.80333	
	A/C WINDOW 2T	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	59	5.90000	530.00000	5.90000	
	A/C WINDOW 1T	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	59	5.90000	530.00000	5.90000	
	A/C PAD MID. 2T	35.33384	0.00000	35.33384	801.37	4.94000	0.00000	4.94000	59	6.50000	742.00000	3.25000	
	A/C PAD MID. 1T	2632.25000	65.21503	65.21503	4199.08	8.02774	0.00000	8.02774	12	20.47100	7950.00000	6.80333	
	CHILLER-AIR COOL RECIP. 20T	0.00000	0.00000	0.00000	3190.97	0.00000	0.00000	0.00000	117	28.40000	10759.00000	7.15000	
	CHILLER-AIR COOL REC. 50T	0.00000	0.00000	0.00000	4214.21	27.95000	0.00000	27.95000	117	30.00000	19080.00000	10.07500	
	CHILLER-AIR COOL REC. 10T	0.00000	0.00000	0.00000	1091.25	12.09000	0.00000	12.09000	117	72.80000	40280.00000	18.20000	
	CHILLER-AIR COOL REC. 15T	0.00000	0.00000	0.00000	2460.13	12.09000	0.00000	12.09000	117	72.80000	3710.00000	5.20000	
	CHILLER-AIR COOL REC. 5T	0.00000	0.00000	0.00000	2460.13	12.09000	0.00000	12.09000	117	72.80000	3710.00000	5.20000	
	CHILLER-WAT. COOL REC. 10T	0.00000	0.00000	0.00000	3230.17	23.75000	0.00000	23.75000	117	28.40000	8260.00000	7.15000	
	CHILLER-WAT. COOL REC. 50T	0.00000	0.00000	0.00000	7310.17	23.75000	0.00000	23.75000	117	28.40000	9560.00000	7.15000	
	CHILLER-WAT. COOL REC. 20T	0.00000	0.00000	0.00000	3230.17	23.75000	0.00000	23.75000	117	28.40000	8260.00000	7.15000	
	CHILLER-WAT. COOL REC. 100T	0.00000	0.00000	0.00000	3230.17	23.75000	0.00000	23.75000	117	28.40000	8260.00000	7.15000	
	CHILLER-WAT. COOL REC. 10T	0.00000	0.00000	0.00000	3230.17	23.75000	0.00000	23.75000	117	28.40000	8260.00000	7.15000	
	CHILLER-WAT. COOL REC. 200T	0.00000	0.00000	0.00000	3230.17	23.75000	0.00000	23.75000	117	28.40000	8260.00000	7.15000	
	CHILL. HERMETIC GENT. 100T	0.00000	0.00000	0.00000	4998.25	33.15000	0.00000	33.15000	117	62.40000	37289.00000	15.60000	
	CHILL. HERMETIC GENT. 300T	0.00000	0.00000	0.00000	4998.25	33.15000	0.00000	33.15000	117	62.40000	37289.00000	15.60000	
	CHILL. HERMETIC GENT. 900T	0.00000	0.00000	0.00000	4998.25	33.15000	0.00000	33.15000	117	62.40000	37289.00000	15.60000	

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE 65	
Zone: 10	COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G-10X)						ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
		By Resources			Washington D.C. Total	Annual Maintenance and Repair				Replacement and High Costs Tasks					
		um	labor	material		equipment	labor	material	equipment	yr	labor	material	equipment		
DEVICES															
	THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000		
	HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	59	0.78000	100.26540	0.78000		
	FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	88	0.78000	100.04280	0.78000		
	RADIATION SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	26	0.78000	77.11500	0.78000		
	WIND VELOCITY SENSOR	CT	5.17966	10.39381	9.17966	218.59	1.25851	0.00000	1.25851	13	0.78000	45.52700	0.78000		
	PRESSURE SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	26	0.78000	58.30000	0.78000		
	DAMPER CONTROLLER/ELECT.	CT	9.45061	33.63194	9.45061	247.97	1.27872	0.00000	1.27872	19	2.60000	287.20730	2.60000		
	SIMPLEX AIR COMP. 1 HP	CT	23.76690	23.64663	17.13703	541.46	3.32283	3.30602	2.39592	32	3.67900	6103.82980	1.83950		
See NOTES on the last page of this table for Explanation of Column Headings															

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)														PAGE 66		
Zone: 11		COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
			By Resources			Washington D.C. Total	Annual Maintenance and Repair			Replacement and High Costs Tasks						
			labor	material	equipment		labor	material	equipment	yr	labor	material	equipment			
HVAC		NATURAL GAS SYSTEM														
	EQUIPMENT															
	GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	16	0.39000	98.58000	0.39000				
	PIPING SYSTEM	TF	5.14477	9.19748	2.58811	117.70	0.71929	1.28589	55	1076.45000	1929.20000	537.22500				
	PIPE/FITTINGS, STEEL/IRON	CT	0.22690	7.30192	0.22690	12.40	0.01753	0.00000	10	0.26000	19.08000	0.26000				
	PRESS. REDUCING VALVE, 2"	CT	0.36420	123.72691	0.24480	131.60	0.01753	0.00000	10	0.62400	323.30000	0.31200				
	FUEL OIL SYSTEM															
	STORAGE SYSTEMS															
	OIL STORAGE TANK, 275 GAL.	CT	0.25168	15.90424	0.12584	21.21	0.00000	0.00000	22	2.60000	164.30000	1.30000				
	OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	0.39200	30	0.65000	10.60000	0.65000				
	FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	20	1.30000	620.10000	1.30000				
	DISTRIBUTION SYSTEM															
	PIPE/FITTINGS, COPPER	TF	8.29928	145.50068	4.20098	320.61	0.16072	0.30007	18	55.51000	1113.00003	27.75500				
	LPG SYSTEM															
	STORAGE SYSTEM															
	LPG STORAGE TANK, 1000 GAL	CT	0.50336	152.37288	0.25168	162.98	0.00000	0.00000	22	5.20000	1574.10000	2.60000				
	DISTRIBUTION SYSTEM															
	PIPE/FITTINGS, STEEL/IRON	TF	5.11331	9.18106	2.55665	116.97	0.71489	1.28360	55	1076.45000	1929.20000	537.22500				
	STEAM, CENTRAL															
	PRESS. RED./REG. SYSTEM	CT	13.41198	129.67927	12.89067	432.19	1.72935	1.64565	18	7.35800	832.10000	3.67900				
	STEAM CONVERTOR, <500,000	CT	13.23362	79.92016	11.68695	375.11	1.38130	1.37028	13	15.00000	294.68000	6.50000				
	FLASH TANK, 24 GAL.	CT	12.45036	399.09758	6.22318	662.35	0.00000	0.00000	4	7.80000	250.53100	3.90000				
	STEAM REG. VALVE 2"	CT	4.85836	270.65224	4.85836	380.84	0.67045	24.21142	22	0.65000	1007.00000	0.65000				
	COND. METER, <300 #/H..															
	VALVES															
	RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	30	1.43000	20.22480	0.71500				
	EQUIPMENT															
	CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	30	5.20000	175.96000	2.60000				
	BASEBOARD RADIATOR 10 FT	CT	1.72172	76.86155	0.86086	113.16	0.00000	0.00000	12	5.20000	232.14000	2.60000				
	FINNED RADIATOR, WALL 10 F	CT	1.72172	86.86409	0.86086	123.16	0.00000	0.00000	12	5.20000	262.35000	2.60000				
	SOLAR EQUIPMENT															
	SOLAR PANEL, 3' X 8'	CT	1.45470	130.47540	0.72735	161.14	0.00000	0.00000	11	3.90000	349.80000	1.95000				
	SOLAR STORAGE TANK, 1000GAL	CT	2.94216	413.82612	1.47108	475.85	0.00000	0.00000	15	15.60000	2194.20000	7.80000				
	PIPING SYSTEM															
	PIPE/FITTINGS, PVC	TF	0.04067	0.00376	0.04067	0.93	0.00569	0.00052	53	41.70530	669.12500	20.85265				
	HEATING GENERATION EQUIPMENT															
	BOILER GAS 250 KBTU/HR	CT	282.25616	862.55123	277.65091	7249.38	38.17432	57.80377	38.17432	18	45.00000	3169.40000	32.50000			
	BOILER GAS 2000 KBTU/HR	CT	330.64546	2929.06851	311.02709	10365.33	42.57020	111.69417	42.57020	18	194.60000	15032.92000	46.15000			
	BOILER GAS 10,000 KBTU/HR	CT	349.45759	10127.11917	323.02806	17968.24	43.93063	659.87853	43.93063	18	248.69000	38160.00000	62.17250			
	BOILER COAL 40,000 KBTU/HR	CT	3940.0943	127384.44000	1145.1428	207801.94	101.91804	0.00000	68.46908	18	20800.000	636000.00000	4160.00000			
	REPAIR BOILER															
	BOILER COAL 100,000 KBTU/H	CT	7102.1500	294798.94260	1825.4290	438990.20	122.68824	0.00000	78.85419	12	1050.40000	148400.00000	262.60000			
	REPAIR BOILER															
	BOILER OIL 250 KBTU/HR	CT	327.73823	737.40319	320.83035	8148.40	44.53314	40.30691	44.53314	12	1313.78000	276766.00000	328.44500			
	BOILER OIL 2000 KBTU/HR	CT	372.66015	2418.44397	353.04178	10807.42	48.44425	40.30691	48.44425	18	65.00000	3169.40000	16.25000			
	BOILER OIL 10,000 KBTU/HR	CT	416.37554	5728.80851	389.94601	15087.52	53.28438	40.30691	53.28438	18	184.60000	15032.92000	46.15000			
	BOILER GAS/OIL 2000 KBTU/H	CT	343.69326	3143.33643	324.07489	10875.52	44.39441	44.95379	44.39441	18	248.69000	38160.00000	62.17250			
	BOILER GAS/OIL 20000 KBTU	CT	424.00123	18981.33411	354.78432	23076.17	46.37642	69.20208	46.37642	18	184.60000	18689.92000	46.15000			
	BOILER PNEUMAT. COAL SPREAD.	CT	1449.8519	4862.98108	1335.5658	37437.11	181.25241	126.70339	181.25241	18	651.30000	71020.00000	162.82500			
	ASH HANDLING EQUIPMENT	CT	5650.8015	71228.20793	3065.4004	191135.10	308.69967	147.49992	308.69967	7	364.00000	11236.00000	91.00000			
	FUEL OIL EQUIPMENT	CT	7.98302	117.55041	3.99151	315.83	0.45771	147.49992	308.21526	12	104.00000	21200.00000	2600.00000			
	CHEMICAL FEED SYSTEM	CT	5.80639	1391.38602	5.11319	316.17	0.00000	0.00000	9	5.20000	604.20000	3.25000				
	FEED-WATER SUPPLY	CT	143.80639	1391.38602	5.11319	4544.97	0.00000	0.00000	9	5.20000	778.04000	3.25000				
	FEED-WATER	CT	219.48648	7019.32000	88.23174	11577.23	18.65063	0.00000	9.32531	12	260.00000	21200.00000	65.00000			
	DEAERATOR															
See NOTES on the last page of this table for Explanation of Column Headings																

See NOTES on the last page of this Table for Explanation of Column Headings

COMPONENT DESCRIPTION	Zone: 10	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (P=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		Labor	material	equipment	D.C. Total	Labor	material	equipment	material
VARIABLE VOLUME 50000 CFM	CT	67.56368	4429.37417	40.30264	5874.48	7.72209	172.22946	5.20370	27305.60000
TERM. REHEAT 6500 CFM	CT	60.48968	2073.74177	33.82432	3360.42	6.76218	66.77190	4.30525	4279.22000
TERM. REHEAT 10000 CFM	CT	62.42928	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	6181.92000
TERM. REHEAT 25000 CFM	CT	77.68072	6746.06885	40.10512	8387.63	7.13124	146.61005	4.67491	15271.50000
2 PIPE INDUCTION 6500 CFM	CT	95.84156	9740.77293	46.62836	11756.98	7.50150	170.06125	5.04557	22853.60000
2 PIPE INDUCTION 10000 CFM	CT	60.48968	2073.74177	33.82432	3360.42	6.76218	66.77190	4.30525	4279.22000
2 PIPE INDUCTION 25000 CFM	CT	62.42928	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	6181.92000
2 PIPE INDUCTION 5000 CFM	CT	77.68072	6746.06885	40.10512	8387.63	7.13124	146.61005	4.67491	15271.50000
4 PIPE INDUCTION 10000 CFM	CT	95.84156	9740.77293	46.62836	11756.98	7.50150	170.06125	5.04557	22853.60000
4 PIPE INDUCTION 25000 CFM	CT	51.64271	512.10812	32.70941	1623.05	7.22013	70.59728	4.58507	4279.22000
4 PIPE INDUCTION 5000 CFM	CT	50.31125	604.41759	32.70941	1623.05	7.02000	84.50320	4.28500	6181.92000
4 PIPE INDUCTION 10000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	5.87500	15274.60000
4 PIPE INDUCTION 25000 CFM	CT	55.73028	1227.78957	37.85844	2435.09	7.80000	171.65640	6.26500	22853.60000
4 PIPE FAN COIL 200 CFM	CT	50.50219	564.12010	49.04749	1174.85	6.65391	15.33206	6.65391	1272.00000
4 PIPE FAN COIL 400 CFM	CT	50.21125	380.60415	32.07941	1461.37	7.02000	53.21200	4.48500	3710.00000
4 PIPE FAN COIL 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	312.70000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	312.70000
SIN. ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	4279.22000
SIN. ZONE DRAW THRU 10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	6181.92000
SIN. ZONE DRAW THRU 25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	5.87500	15274.60000
SIN. ZONE DRAW THRU 50000CFM	CT	55.79028	1227.78957	37.85844	2435.09	7.80000	171.65640	6.26500	22853.60000
SIN. ZONE DRAHTHRU 1000CFM	CT	50.50219	564.12010	49.04749	1174.85	6.65391	15.33206	6.65391	1272.00000
SIN. ZONE DRAHTHRU 2500CFM	CT	50.21125	380.60415	32.07941	1461.37	7.02000	53.21200	4.48500	3710.00000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	312.70000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	312.70000
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	312.70000
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	312.70000
CASEFIED RADIANT HTR 5000H	CT	9.28348	0.00000	9.28348	210.89	1.82000	1.59000	1.82000	312.70000
HEAT PUMP ST	CT	26.03546	0.00000	26.03546	590.48	1.82000	1.59000	1.82000	312.70000
HEAT PUMP 10T	CT	64.01850	0.00000	64.01850	1407.30	1.82000	1.59000	1.82000	312.70000
HEAT PUMP 25T	CT	84.01526	0.00000	84.01526	1919.07	1.82000	1.59000	1.82000	312.70000
HEAT PUMP CT	CT	30.07151	60.01792	30.07151	742.05	1.82000	1.59000	1.82000	312.70000
DUCTCOIL 1-ROW H.M. 12X24	CT	18.59676	0.00000	18.59676	392.02	2.60000	0.00000	2.60000	80.56000
VENTILATION SYSTEM	CT	35.68448	690.43049	32.00878	1487.99	4.30345	21.34279	4.30345	2851.40000
FIXTURES	CT	36.39522	715.10515	32.36215	1527.64	4.40282	22.72423	4.35314	2929.84000
FORCE DRAFT FAN 10,000 CFM	CT								
IND DRAFT FAN 10000 CFM	CT								
EXHAUST SYSTEM	CT								
EQUIPMENT	CT								
EXHAUST FAN <200 CFM	CT	4.81713	23.70918	4.81713	132.96	0.52303	1.39881	0.52303	41.58380
EXHAUST FAN 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	296.80000
EXHAUST FAN 10,000 CFM	CT	39.67457	759.94761	32.76065	1637.64	4.34331	22.68441	4.27935	1805.18000
EXHAUST FAN 25,000 CFM	CT	39.67457	1852.27698	17.68514	2681.73	4.34331	68.58050	2.17166	4112.00000
EXHAUST FAN 50,000 CFM	CT	41.82672	2311.54000	33.29869	3232.88	4.34331	72.92640	2.17166	5406.00000
EXHAUST FAN 5000 CFM	CT	9.59517	4.95128	9.44678	222.09	1.34149	0.69223	1.32075	1632.40000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	689.00000
FIXTURES	CT								
METAL FLUE/CHIMNEY	LF	3.39430	46.25946	1.69715	117.81	0.00000	0.00000	0.00000	124.02000
SPECIAL SYSTEM	CT								
HUMIDITY CONTROL SYSTEM	CT								
ROOM HUMIDIFIER, FLOOR TYPE	CT	4.64835	83.63808	4.64835	189.06	0.06659	0.81447	0.06659	169.60000
CONTROLS/INSTRUMENT	CT								

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION

Zone: 11

um	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10X)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS									
	By Resources				Annual Maintenance and Repair					Replacement and High Costs Tasks				
	Labor	material	equipment	D.C. Total	Labor	material	equipment	yr	Labor	material	equipment	Labor	material	equipment
BLOWOFF SYSTEM	1.23734	70.11911	0.61867	96.20	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000	5.20000	294.68000	2.60000
HOUSE FURN. GAS 25KBTU/HR	34.23066	392.07227	31.75598	1160.50	0.33193	31.18868	0.33193	9	20.80000	710.20000	10.40000	20.80000	710.20000	10.40000
HOUSE FURN. GAS 100KBTU/HR	39.21711	491.42204	34.26775	1365.03	0.33712	37.32070	0.33712	9	41.60000	943.40000	20.80000	41.60000	943.40000	20.80000
HOUSE FURN. GAS 200KBTU/HR	39.21711	1175.17271	34.26775	2048.78	0.33712	45.46147	0.33712	9	41.60000	3572.20000	20.80000	41.60000	3572.20000	20.80000
HOUSE FURN. OIL 25KBTU/HR	42.94766	20.41268	40.42778	1686.54	0.33712	44.29850	0.33712	9	20.80000	1696.00000	10.40000	20.80000	1696.00000	10.40000
HOUSE FURN. OIL 100KBTU/HR	47.89682	992.09347	42.94766	2082.56	0.33712	48.31603	0.33712	9	41.60000	2716.99200	20.80000	41.60000	2716.99200	20.80000
HOUSE FURN. OIL 200KBTU/HR	47.89682	1163.77241	42.94766	2234.23	0.33712	56.56253	0.33712	9	41.60000	3190.60000	20.80000	41.60000	3190.60000	20.80000
HOUSE FURN. ELECT 25KBTU/HR	21.02941	437.26422	18.55473	906.29	0.42788	21.14487	0.42788	9	20.80000	1202.04000	10.40000	20.80000	1202.04000	10.40000
HOUSE FURN. ELECT 100KBTU/HR	25.97877	575.31852	21.02941	1148.64	0.42788	30.144861	0.42788	9	41.60000	1502.55000	20.80000	41.60000	1502.55000	20.80000
HOUSE FURN. ELECT 200KBTU/HR	25.97877	713.80408	21.02941	1307.16	0.42788	39.11801	0.42788	9	41.60000	1708.96000	20.80000	41.60000	1708.96000	20.80000
CASE IRON RADIATOR 10 SECT	1.72172	76.86155	0.00000	113.16	0.00000	0.00000	0.00000	30	5.20000	195.96000	2.60000	5.20000	195.96000	2.60000
BASEBOARD RADIATOR 10 FT	1.72172	86.86409	0.86086	133.16	0.00000	0.00000	0.00000	12	5.20000	232.16000	2.60000	5.20000	232.16000	2.60000
FIRED RADIATOR, WALL 10 F	0.08342	0.00000	0.08342	1.89	0.01166	0.00000	0.00000	30	3.47100	135.48000	1.73550	3.47100	135.48000	1.73550
EXPANSION TANK	13.20409	129.67927	12.88477	427.53	1.70056	1.64565	1.70056	18	7.35800	832.10000	3.67900	7.35800	832.10000	3.67900
STEAM CONVERTOR, <300,000	13.23582	79.92019	11.68695	375.11	1.39130	1.37028	1.39130	18	13.00000	594.68000	6.50000	13.00000	594.68000	6.50000
FLASH TANK, 24 GAL.	17.11528	24.57977	17.35863	212.96	2.39237	3.39725	2.39237	37	3.59395	346.82000	1.78698	3.59395	346.82000	1.78698
STORAGE TANK, DMW	40.51293	1240.23068	29.33188	4109.42	4.78440	81.38435	4.78440	22	65.00000	16784.00000	46.15000	65.00000	16784.00000	46.15000
IND. FURN. GAS/OIL 500 MBTU	70.77591	2547.11038	57.37395	628.03	7.38684	169.61753	7.38684	22	184.60000	1574.10000	2.60000	184.60000	1574.10000	2.60000
IND. FURN. GAS/OIL 2000 MBTU	1.93960	587.13930	0.96980	3.59	0.00000	0.00000	0.00000	11	5.20000	41.34000	5.37225	5.20000	41.34000	5.37225
SURGE TANK, 1000 GAL	0.15467	0.08071	0.15467	27.12	0.02162	0.01128	0.02162	30	10.74450	51.00720	2.77550	10.74450	51.00720	2.77550
DIST. PIPING SYSTEM	0.92981	7.29352	0.92981	1731.03	0.02003	0.09732	0.02003	18	5.55100	8034.00000	120.90000	5.55100	8034.00000	120.90000
PIPE/FITTINGS, ST. & C.I.	32.58009	104.19418	17.00817	306.74	0.02003	0.09732	0.02003	18	5.55100	8034.00000	120.90000	5.55100	8034.00000	120.90000
PIPE/FITTINGS, COPPER	9.31560	95.46235	9.31560	28.26	0.07085	0.03553	0.07085	22	0.26000	17.91400	0.26000	0.26000	17.91400	0.26000
PIPE AND FITTINGS, PVC	0.97282	6.19244	0.97282	40.68	0.12397	0.03651	0.12397	12	0.57200	94.05380	0.57200	0.57200	94.05380	0.57200
GATE VALVE, 3/8" - 1 1/2"	0.39754	31.66343	0.39754	47.07	0.05910	0.07301	0.05910	12	0.68900	17.91400	0.68900	0.68900	17.91400	0.68900
GATE VALVE, 2" - 3"	1.49481	13.16507	1.49481	23.97	0.17709	0.10134	0.17709	12	0.68900	17.91400	0.68900	0.68900	17.91400	0.68900
DRAIN VALVE	0.68054	9.62498	0.68054	62.35	0.00000	0.00000	0.00000	9	1.43000	250.53100	3.90000	1.43000	250.53100	3.90000
RADIATOR VALVE 1"	12.50336	399.89758	6.22518	261.26	0.00000	0.00000	0.00000	4	2.60000	151.41040	2.60000	2.60000	151.41040	2.60000
PRESSURE REDUCER VALVE 2"	6.60768	111.39395	6.60768	447.09	0.19043	5.86177	0.19043	6	0.94338	954.00000	91.00000	0.94338	954.00000	91.00000
STEAM TRAP, F & T, <1"	13.56975	139.33118	13.56975	265.48	0.09438	0.58012	0.09438	18	0.94338	954.00000	91.00000	0.94338	954.00000	91.00000
PIPE INSULATION	3.73052	180.84689	3.73052	746.45	0.14025	0.34503	0.14025	9	8.39800	2544.00000	4.19900	8.39800	2544.00000	4.19900
CIRCULATION PUMP, 5 HP	22.17634	665.03934	2.73137	1239.24	2.37832	15.77082	2.37832	12	15.60000	1908.00000	7.80000	15.60000	1908.00000	7.80000
COND. COVR. 10 - 15 GAL.	0.00000	744.54120	19.59376	590.48	3.64000	0.00000	3.64000	385	8.38500	1855.00000	4.19250	8.38500	1855.00000	4.19250
EQUIPMENT	26.03546	0.00000	26.03546	1497.30	9.23000	0.00000	9.23000	385	20.41000	7950.00000	6.80333	20.41000	7950.00000	6.80333
A/C DX PACKAGE 5T	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	385	47.71000	21200.00000	11.92750	47.71000	21200.00000	11.92750
A/C DX PACKAGE 50T	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	192	5.98000	530.00000	5.98000	5.98000	530.00000	5.98000
A/C WINDOW 1T	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	192	5.98000	530.00000	5.98000	5.98000	530.00000	5.98000
A/C WINDOW 2T	35.33384	0.00000	35.33384	801.37	4.96000	0.00000	4.96000	192	6.50000	1684.00000	3.25000	6.50000	1684.00000	3.25000
A/C PAD RID. 4T	69.72030	2632.26500	25.21503	4199.08	8.80274	0.00000	8.80274	12	20.41000	7950.00000	6.80333	20.41000	7950.00000	6.80333
A/C PAD ROUTED 20 TON	160.86517	0.00000	160.86517	3300.97	22.95000	0.00000	22.95000	385	58.40000	10739.00000	7.15000	58.40000	10739.00000	7.15000
CHILLER-AIR COOL RECIP. 20T	199.81517	0.00000	199.81517	4214.21	27.05000	0.00000	27.05000	385	72.80000	19080.00000	18.20000	72.80000	19080.00000	18.20000
CHILLER-AIR COOL REC. 50T	86.47493	0.00000	86.47493	1961.23	12.55000	0.00000	12.55000	385	35.60000	4080.00000	5.20000	35.60000	4080.00000	5.20000
CHILLER-AIR COOL REC. 10T	125.52813	0.00000	125.52813	2946.13	17.50000	0.00000	17.50000	385	35.60000	3710.00000	6.93333	35.60000	3710.00000	6.93333
CHILLER-AIR COOL REC. 15T	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	22.75000	385	28.60000	6360.00000	5.20000	28.60000	6360.00000	5.20000
CHILLER-AIR COOL REC. 20T	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	22.75000	385	28.60000	6360.00000	5.20000	28.60000	6360.00000	5.20000
CHILLER-WAT. COOL REC. 50T	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	22.75000	385	28.60000	6360.00000	5.20000	28.60000	6360.00000	5.20000
CHILLER-WAT. COOL REC. 10T	144.12489	0.00000	144.12489	3038.15	22.75000	0.00000	22.75000	385	28.60000	5900.00000	5.20000	28.60000	5900.00000	5.20000
CHILLER-WAT. COOL REC. 15T	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	22.75000	385	28.60000	6360.00000	5.20000	28.60000	6360.00000	5.20000
CHILLER-WAT. COOL REC. 20T	162.72165	0.00000	162.72165	3430.17	22.75000	0.00000	22.75000	385	28.60000	6360.00000	5.20000	28.60000	6360.00000	5.20000
CHILL. HERMETIC CENT. 100T	237.10869	0.00000	237.10869	4998.25	33.15000	0.00000	33.15000	385	16.57500	37789.00000	15.60000	16.57500	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	237.10869	0.00000	237.10869	4998.25	33.15000	0.00000	33.15000	385	16.57500	37789.00000	15.60000	16.57500	37789.00000	15.60000
CHILL. HERMETIC CENT. 900T	237.10869	0.00000	237.10869	4998.25	33.15000	0.00000	33.15000	385	16.57500	37789.00000	15.60000	16.57500	37789.00000	15.60000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

Zone: 11	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		Washington		Annual Maintenance and Repair		Replacement and High Costs Tasks	
		UM	By Resources		D.C. Total	Annual Maintenance and Repair		Replacement and High Costs Tasks	
			Labor	material	equipment	Labor	material	Yr	equipment
	CHILL. OPEN CENT. 300T	CT	618.34227	0.00000	309.17114	13034.66	0.00000	35	43.22500
	CHILL. OPEN CENT. 900T	CT	237.10669	0.00000	118.55435	4998.25	0.00000	35	16.57500
	CHILL. DBL. BMDL. HERN. 100T	CT	274.30221	0.00000	137.15111	5782.29	0.00000	35	19.17500
	CHILL. DBL. BMDL. HERN. 300T	CT	274.30221	0.00000	137.15111	5782.29	0.00000	35	19.17500
	CHILL. DBL. BMDL. HERN. 900T	CT	274.30221	0.00000	137.15111	5782.29	0.00000	35	19.17500
	CHILL. ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.86	0.00000	35	56.87500
	CHILL. ONE STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	0.00000	35	8.38500
	CHILL. ONE STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2528.53	0.00000	35	8.38500
	CHILL. TWO STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	0.00000	35	8.38500
	CHILL. TWO STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2528.53	0.00000	35	8.38500
	CHILL. TWO STG. ABS. 300T	CT	111.58056	0.00000	55.79028	2352.12	0.00000	35	7.80000
	CHILL. TWO STG. ABS. 900T	CT	111.58056	0.00000	55.79028	2352.12	0.00000	35	7.80000
	AIR COOLED CONDENSER 5T	CT	16.73708	0.00000	8.34854	352.82	0.00000	2	1.70000
	AIR COOLED CONDENSER 20T	CT	16.73708	0.00000	8.34854	352.82	0.00000	2	1.70000
	AIR COOLED CONDENSER 50T	CT	29.75482	0.00000	14.87741	627.23	0.00000	4	1.60000
	AIR COOLED CONDENSER 100T	CT	29.75482	0.00000	14.87741	627.23	0.00000	4	1.60000
	COOLING TOWER 50T	CT	32.54332	0.00000	16.27217	686.03	0.00000	4	2.25000
	COOLING TOWER 100T	CT	101.35232	0.00000	50.64471	2136.51	0.00000	14	17.00000
	COOLING TOWER 300T	CT	118.06623	0.00000	59.04471	2489.31	0.00000	17	24.00000
	COOLING TOWER 500T	CT	128.31764	0.00000	64.15882	2704.94	0.00000	17	24.00000
	EVAPORATIVE CONDENSER 20T	CT	39.30963	0.00000	20.75482	1254.44	0.00000	4	2.25000
	EVAPORATIVE CONDENSER 100T	CT	97.63249	0.00000	49.81650	2058.10	0.00000	13	16.00000
	EVAPORATIVE CONDENSER 300T	CT	22.31611	0.00000	11.03959	470.42	0.00000	1	1.89
	EXPANSION TANK	CT	0.06342	0.00000	0.03342	1.89	0.00000	0	0.0166
	REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	0.00000	0	0.65000
	REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	0.00000	0	0.65000
	REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	0.00000	0	0.65000
	DIST. PIPING SYSTEM	TF	1.77466	5.98947	1.01342	43.80	0.03526	18	0.03526
	PIPE/FITTINGS ST. & C.I.	TF	1.94620	16.93622	1.02724	58.14	0.01514	12	0.01514
	PIPE/FITTINGS COPPER	TF	0.43551	0.57648	0.11605	3.21	0.00694	0	0.00694
	PIPE/FITTINGS PVC	CT	0.43551	6.19244	0.43551	16.07	0.02899	0	0.02899
	GATE VALVE 3/8" - 1 1/2"	CT	0.39754	31.66343	0.39754	40.68	0.02910	12	0.02910
	GATE VALVE 2" - 3"	CT	1.49481	13.16507	1.49481	47.07	0.11134	12	0.11134
	DRAIN VALVE	CT	13.56975	131.60938	13.56975	439.37	0.09438	18	0.09438
	PIPE INSULATION	CT	13.56975	180.86689	13.56975	264.84	0.13632	9	0.13632
	CIRCULATOR PUMP < 1 HP	CT	9.15626	665.03934	5.44424	860.82	0.14025	9	0.14025
	5 TON CHILLER ACH RECIP	CT							
	HEAT/COOL GENERATION	CT							
	EQUIPMENT	CT							
	MULTI-ZONE 6500 CFM	CT	51.36214	495.58400	32.65486	1600.61	69.28725	26	4.56545
	MULTI-ZONE 10,000 CFM	CT	51.36214	606.88418	32.65486	1711.91	84.84805	26	4.56545
	MULTI-ZONE 25,000 CFM	CT	54.95166	1100.64768	35.40753	2268.83	153.88078	26	4.95030
	MULTI-ZONE 50,000 CFM	CT	56.94117	1242.80977	38.19704	2474.25	173.76336	26	5.34030
	MULTI-ZONE 2500 CFM	CT	51.43230	380.60415	32.54433	1480.97	53.21200	26	4.55000
	DUAL DUCT 6500 CFM	CT	50.43230	495.58400	32.18994	1581.01	69.28725	26	4.55000
	DUAL DUCT 10,000 CFM	CT	50.43230	607.49072	32.94261	1692.92	84.93285	26	4.55000
	DUAL DUCT 25,000 CFM	CT	51.36214	1086.09071	37.73212	2454.65	173.76336	26	4.95030
	DUAL DUCT 50,000 CFM	CT	51.36214	1242.80977	37.73212	2454.65	173.76336	26	4.95030
	3 DK. MULTI ZONE 6500 CFM	CT	34.15166	407.29072	32.65486	1712.52	84.93285	26	4.55000
	3 DK. MULTI ZONE 10,000 CFM	CT	34.15166	495.58400	32.65486	1712.52	84.93285	26	4.55000
	3 DK. MULTI ZONE 25,000 CFM	CT	36.94117	925.50912	35.40753	2003.81	129.33478	26	4.95030
	3 DK. MULTI ZONE 50,000 CFM	CT	36.94117	1100.64768	35.40753	2003.81	129.33478	26	4.95030
	D.O. VARI. VOL. 6500 CFM	CT	50.43230	495.58400	32.18994	1581.01	69.28725	26	4.55000
	D.O. VARI. VOL. 10000 CFM	CT	50.43230	607.49072	32.18994	1692.92	84.93285	26	4.55000
	D.O. VARI. VOL. 25000 CFM	CT	53.22182	1084.94317	35.21615	2206.86	171.88514	26	5.34030
	D.O. VARI. VOL. 50000 CFM	CT	56.01133	1234.15212	38.00367	2414.87	153.88078	26	5.34030
	D.O. VARI. VOL. 100,000 CFM	CT	55.79028	2059.81147	27.89514	3235.87	287.98080	26	5.34030
	VARIABLE VOLUME 6500 CFM	CT	50.43230	495.58400	32.18994	1581.01	69.28725	26	4.55000
	VARIABLE VOLUME 10000 CFM	CT	50.43230	607.49072	32.18994	1692.92	84.93285	26	4.55000
	VARIABLE VOLUME 25000 CFM	CT	42.06376	688.20015	23.82140	1583.83	96.21678	26	4.55000

See NOTES on the last page of this table for Explanation of Column Headings



EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)

PAGE 63

Zone: 10	COMPONENT DESCRIPTION	PRESENT NORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (G=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS			
		By Resources		D.C. Total	Washington	Annual Maintenance and Repair		Replacement and High Costs Tasks	
		labor	material	equipment		labor	material	equipment	material
CT	CHILL. OPEN CENT. 300T	161.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	61771.50000
CT	CHILL. OPEN CENT. 900T	237.10869	0.00000	118.55435	4998.25	38.15000	0.00000	19.17500	127200.00000
CT	CHILL. DBL. BMDL. HERN. 100T	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	127200.00000
CT	CHILL. DBL. BMDL. HERN. 300T	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	127200.00000
CT	CHILL. DBL. BMDL. HERN. 900T	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	127200.00000
CT	CHILL. ONE STG. ABS. 100T	813.60825	0.00000	456.80413	17150.86	113.75000	0.00000	56.87500	139920.00000
CT	CHILL. ONE STG. ABS. 300T	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	61480.00000
CT	CHILL. ONE STG. ABS. 900T	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	61480.00000
CT	CHILL. TWO STG. ABS. 300T	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	113420.00000
CT	CHILL. TWO STG. ABS. 900T	16.73708	0.00000	8.34854	379.60	2.34000	0.00000	1.17000	113420.00000
CT	AIR COOLED CONDENSER 50T	16.73708	0.00000	8.34854	379.60	2.34000	0.00000	1.17000	113420.00000
CT	AIR COOLED CONDENSER 20T	29.75482	0.00000	14.87741	352.82	4.16000	0.00000	2.08000	67840.00000
CT	AIR COOLED CONDENSER 100T	32.56433	0.00000	16.27217	427.23	4.55000	0.00000	2.27500	67840.00000
CT	COOLING TOWER 100T	101.35234	0.00000	50.67617	2136.51	14.17000	0.00000	7.08500	10778.80000
CT	COOLING TOWER 300T	128.08943	0.00000	64.15883	2589.33	17.51000	0.00000	8.75000	10778.80000
CT	COOLING TOWER 900T	128.08943	0.00000	64.15883	2589.33	17.51000	0.00000	8.75000	10778.80000
CT	EVAPORATIVE CONDENSER 20T	97.50963	0.00000	48.81482	2074.94	8.33000	0.00000	4.16500	16377.00000
CT	EVAPORATIVE CONDENSER 100T	97.50963	0.00000	48.81482	2074.94	8.33000	0.00000	4.16500	16377.00000
CT	EVAPORATIVE CONDENSER 300T	22.51811	0.00000	11.25936	470.12	1.34500	0.00000	0.67250	3868.80000
CT	EXPANSION TANK	0.08342	0.00000	0.08342	1.89	0.01166	0.00000	0.00000	10038.20000
CT	REFRIG. FAN COIL 1T	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.32500	31800.00000
CT	REFRIG. FAN COIL 3T	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.32500	31800.00000
CT	REFRIG. FAN COIL 5T	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.32500	31800.00000
TF	PIPE/FITTINGS ST. & C.I.	1.77466	5.96947	1.01342	43.80	0.03526	0.01840	0.03526	41.34000
TF	PIPE AND FITTINGS, COPPER	1.94630	16.93622	1.02724	58.14	0.01514	0.00695	0.01514	51.00720
CT	GATE VALVE, 3/8" - 1 1/2"	0.43551	6.19244	0.18698	5.17	0.02614	0.02614	0.02614	8321.00000
CT	GATE VALVE, 2"-3"	0.39754	31.66343	0.39754	16.07	0.02899	0.03651	0.02899	17.91400
CT	DRAIN VALVE	1.69481	13.16507	0.39754	40.68	0.02910	0.07301	0.02910	94.05380
TF	PIPE INSULATION	13.56975	131.60938	13.56975	47.07	0.17709	1.01134	0.17709	17.91400
CT	CIRCULATOR PUMP, < 1 HP	3.70242	180.86669	3.70242	439.37	0.09438	0.55052	0.09438	901.00000
CT	HEAT/COOL GENERATION	9.15536	665.03934	5.44424	264.84	0.13632	0.34503	0.13632	742.00000
CT	EQUIPMENT				860.02	0.14025	8.08859	0.14025	2544.00000
CT	MULTI-ZONE 6500 CFM	54.92241	1191.70333	33.25521	2368.01	7.08274	68.42252	4.50041	5997.48000
CT	MULTI-ZONE 10,000 CFM	55.68356	1541.61390	37.44550	2733.36	7.08274	83.27856	4.50041	8050.70000
CT	MULTI-ZONE 25,000 CFM	42.23316	2885.92673	37.08142	4216.89	7.46635	152.02038	4.87572	15319.40000
CT	MULTI-ZONE 50,000 CFM	68.47829	4629.37416	40.70059	5983.97	7.46635	172.22946	5.25934	2705.60000
CT	DUAL DUCT 6500 CFM	51.14109	380.60415	32.54433	1480.97	7.15000	53.21200	4.55000	5997.48000
CT	DUAL DUCT 10,000 CFM	54.00780	1191.70333	32.79780	2348.73	6.95486	68.42252	4.33647	8050.70000
CT	DUAL DUCT 25,000 CFM	57.76885	1542.21051	32.98819	2714.67	6.95486	83.81198	4.33647	8050.70000
CT	DUAL DUCT 50,000 CFM	67.56368	2871.60808	36.62411	4183.29	7.33848	172.22946	4.87572	15319.40000
CT	3 DX MULTI ZONE 6500 CFM	55.68356	1541.61390	37.44550	2733.36	7.08274	68.42252	4.50041	5997.48000
CT	3 DX MULTI ZONE 10,000 CFM	55.68356	1541.61390	37.44550	2733.36	7.08274	83.27856	4.50041	8050.70000
CT	3 DX MULTI ZONE 25,000 CFM	42.23316	2885.92673	37.08142	4216.89	7.46635	152.02038	4.87572	15319.40000
CT	3 DX MULTI ZONE 50,000 CFM	68.47829	4629.37416	40.70059	5983.97	7.46635	172.22946	5.25934	2705.60000
CT	D.O. VARI. VOL. 100,000CFM	55.68356	1541.61390	37.44550	2733.36	7.08274	68.42252	4.50041	5997.48000
CT	D.O. VARI. VOL. 25000 CFM	42.23316	2885.92673	37.08142	4216.89	7.46635	152.02038	4.87572	15319.40000
CT	D.O. VARI. VOL. 50000 CFM	68.47829	4629.37416	40.70059	5983.97	7.46635	172.22946	5.25934	2705.60000
CT	D.O. VARI. VOL. 100,000CFM	55.68356	1541.61390	37.44550	2733.36	7.08274	68.42252	4.50041	5997.48000
CT	D.O. VARI. VOL. 25000 CFM	42.23316	2885.92673	37.08142	4216.89	7.46635	152.02038	4.87572	15319.40000
CT	D.O. VARI. VOL. 50000 CFM	68.47829	4629.37416	40.70059	5983.97	7.46635	172.22946	5.25934	2705.60000
CT	VARIABLE VOLUME 6500 CFM	55.68356	1541.61390	37.44550	2733.36	7.08274	68.42252	4.50041	5997.48000
CT	VARIABLE VOLUME 10000 CFM	42.23316	2885.92673	37.08142	4216.89	7.46635	152.02038	4.87572	15319.40000
CT	VARIABLE VOLUME 25000 CFM	68.47829	4629.37416	40.70059	5983.97	7.46635	172.22946	5.25934	2705.60000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)										PAGE 69
COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C=10%)					ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS				
	By Resources					Annual Maintenance and Repair				
	Unit	Labor	Material	Equipment	D.C. Total	Labor	Material	Equipment	Yr	labor
Zone: 11										
VARIABLE VOLUME 50000 CFM	CT	56.01133	1242.80977	37.76897	2454.77	7.83091	173.75636	5.28045	26	105.30000
TERM. REHEAT 6500 CFM	CT	60.49048	2073.74177	33.82432	3360.39	6.76218	66.77190	4.30525	11	32.50000
TERM. REHEAT 10000 CFM	CT	62.42926	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	11	32.50000
TERM. REHEAT 25000 CFM	CT	77.68072	6746.04885	40.10512	8397.63	7.13184	166.61005	5.67491	11	37.70000
TERM. REHEAT 50000 CFM	CT	95.84155	9740.77282	46.62832	11256.98	7.13184	170.06125	5.67491	11	37.70000
2 PIPE INDUCTION 4500 CFM	CT	60.49048	2073.74177	33.82432	3360.39	6.76218	66.77190	4.30525	11	32.50000
2 PIPE INDUCTION 10000 CFM	CT	62.42926	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	11	32.50000
2 PIPE INDUCTION 25000 CFM	CT	77.68072	6746.04885	40.10512	8397.63	7.13184	166.61005	5.67491	11	37.70000
2 PIPE INDUCTION 50000 CFM	CT	95.84155	9740.77282	46.62832	11256.98	7.13184	170.06125	5.67491	11	37.70000
4 PIPE INDUCTION 10000 CFM	CT	51.64271	512.10816	32.79514	1623.05	7.20103	71.39748	3.04457	11	113.10000
4 PIPE INDUCTION 25000 CFM	CT	50.21125	604.41739	32.07941	1685.19	7.20103	84.50320	3.04457	11	113.10000
4 PIPE INDUCTION 50000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	288	32.50000
4 PIPE INDUCTION 50000 CFM	CT	53.00077	1227.78957	37.65844	2435.09	7.80000	171.65840	5.26500	288	32.50000
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.60000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.60000
SIN. ZONE DRAIN THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	288	32.50000
SIN. ZONE DRAIN THRU 10000CFM	CT	50.21125	604.41739	32.07941	1685.19	7.02000	84.50320	4.48500	288	32.50000
SIN. ZONE DRAIN THRU 25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	288	32.50000
SIN. ZONE DRAIN THRU 50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65840	5.26500	288	32.50000
SIN. ZONE DRAIN THRU 10000CFM	CT	50.21125	584.12010	49.04749	1724.85	6.65391	15.33206	5.26500	288	113.10000
SIN. ZONE DRAIN THRU 25000CFM	CT	50.21125	360.60415	32.07941	1461.37	7.02000	53.21200	4.48500	288	23.40000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.60000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.60000
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.60000
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.60000
GASIFIED RADIANT HTR 50MBH	CT	9.28818	0.00000	9.28818	210.89	1.30000	0.00000	1.30000	288	2.60000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.40000	0.00000	3.40000	385	8.38500
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	385	14.30000
HEAT PUMP 25T	CT	94.61526	0.00000	94.61526	1919.07	11.83000	0.00000	11.83000	385	19.30000
HEAT PUMP 11	CT	37.25160	0.00000	37.25160	684.56	3.99026	0.00000	3.99026	44	5.53800
DUCT COIL 1-RQW H.W. 12X24	CT	18.59676	0.00000	18.59676	392.02	2.60000	0.00000	2.60000	44	2.34000
VENTILATION SYSTEM										
FIXTURES										
FORCE DRAFT FAN 10,000 CFM	CT	35.68448	690.43049	32.00878	1487.99	4.30345	21.34279	4.30345	15	26.00000
IMO DRAFT FAN 10000 CFM	CT	36.39522	715.10515	32.36215	1527.64	4.40282	22.72423	4.35314	15	26.00000
EXHAUST SYSTEM										
EQUIPMENT										
EXHAUST FAN <200 CFM	CT	4.81713	23.70918	4.81713	132.96	0.52303	1.38981	0.52303	12	3.25000
EXHAUST FAN 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000
EXHAUST FAN 10,000 CFM	CT	39.67457	759.94761	32.76065	1637.64	4.34331	22.68441	4.27935	12	26.00000
EXHAUST FAN 25,000 CFM	CT	41.82674	1852.27698	17.68514	2681.73	4.34331	68.58050	2.17166	12	26.00000
EXHAUST FAN 50,000 CFM	CT	41.82674	2311.54000	33.29869	3232.88	4.34331	72.92640	4.27935	12	26.00000
EXHAUST FAN 5000 CFM	CT	9.48259	3.07313	9.39049	217.84	1.32575	0.42965	1.31288	35	15.60000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	385	3.25000
FIXTURES										
METAL FLUE/CHIMNEY	LF	3.39430	46.25946	1.69715	117.81	0.00000	0.00000	0.00000	11	9.10000
SPECIAL SYSTEM										
HUMIDITY CONTROL SYSTEM										
ROOM HUMIDIFIER, FLOOR TYPE	CT	4.64835	83.63808	4.64835	189.06	0.06659	0.81447	0.06659	6	0.26000
CONTROLS/INSTRUMENT										
See NOTES on the last page of this table for Explanation of Column Headings										

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)													PAGE 70
COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (C-10X)						ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
	By Resources			Washington.			Annual Maintenance and Repair			Replacement and High Costs Tasks			
	D.C. Total			labor			material			equipment			
	um	labor	material	equipment	labor	material	equipment	labor	material	equipment	labor	material	equipment
DEVICES													
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749			231.43	1.27872	0.00000	1.27872	20	0.78000	0.78000
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838			210.89	1.30000	0.00000	1.30000	192	0.78000	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838			210.89	1.30000	0.00000	1.30000	288	0.78000	0.78000
RADIATION SENSOR	CT	9.29838	0.00000	9.29838			210.89	1.30000	0.00000	1.30000	35	0.78000	0.78000
WIND VELOCITY SENSOR	CT	9.22470	6.45118	9.22470			215.67	1.27425	0.00000	1.27425	18	0.78000	0.78000
PRESSURE SENSOR	CT	9.29838	0.00000	9.29838			210.89	1.30000	0.00000	1.30000	35	0.78000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.29838	0.00000	9.29838			210.89	1.30000	0.00000	1.30000	26	2.60000	2.60000
SIMPLEX AIR COMP. 1 HP	CT	20.04249	19.94355	15.27483			459.25	2.80213	2.78829	2.13556	44	3.67900	1.83950
See notes on the last page of this table for Explanation of Column Headings													

See notes on the last page of this table for Explanation of Column Headings

### Notes

1. The resources listed in this table are as of the Date of Study (DOS) and have been calculated using a discount rate (d) of 10 percent. The Date of Study (DOS) is 3 years before the Beneficial Occupancy Date (BOD). All tasks are assumed to occur at mid-year. All resources have been assumed to be constant with no differential escalation from year to year.

2. Component Description - This column contains an indented list of systems, subsystems, components, and high cost task descriptions.

3. Unit of Measure (UM) - This column contains a two-character code to indicate the measurement unit for the component. Units used in this column are as follows:

CT	Count
LF	Linear Foot
SF	Square Foot
TF	Thousands of Linear Feet

4. Labor - Labor resources can be used in one of two ways: (1) labor hours per unit of measure, or (2) dollars per unit of measure assuming a \$1.00/hr labor rate.

5. Materials - Material resources are expressed in dollars per unit of measure in July 1988 dollars for the Washington, DC, area.

6. Equipment - Equipment resources can be used in one of two ways: (1) equipment hours per unit of measure, or (2) dollars per unit of measure assuming a \$1.00/hr equipment rate.

7. Washington, DC, Total - The dollars per unit of measure figures were calculated by applying the Military District of Washington labor and equipment rates to the labor and equipment resources, then adding the labor, material, and equipment costs together to form one total cost figure.

8. Year (YR) - This column contains the average age of the component when the high-cost task or replacement task would be performed.

9. Engineered Performance Standards (EPS) - Most labor and equipment resource data is based on the DOD series of Technical Bulletins as discussed in the body of the report.

## APPENDIX C:

### TECHNICAL BULLETIN INDEX FOR ENGINEERED PERFORMANCE STANDARDS

<u>TB No.</u>	<u>Date</u>	<u>Title</u>
TB 420-1	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Engineers Manual (NAVDOCKS P-700.0)
TB 420-2	5 Oct 72	Engineered Performance Standards Public Works Maintenance: General Handbook (NAVDOCKS P-701.0)
TB 420-3	5 Oct 72	Engineered Performance Standards Public Works Maintenance: General Formulas
TB 420-4	1 Mar 82	Tri-Service Coordination of the Carpentry Handbook
TB 420-5	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Carpentry Formulas
TB 420-6	1 Feb 82	Tri-Service Coordination of the Electric, Electronic Handbook
TB 420-7	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Electric, Electronic Formulas
TB 420-8	1 Feb 82	Tri-Service Coordination of the Heating, Cooling and Ventilating Handbook
TB 420-9	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Heating, Cooling, Ventilating Formulas
TB 420-10	1 Apr 81	Engineered Performance Standards Real Property Maintenance Activities Janitorial Handbook
TB 420-11	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Janitorial Formulas
TB 420-12	1 Apr 83	Engineered Performance Standards Real Property Maintenance Activities Machine Shop, Machine Repairs Handbook
TB 420-13	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Machine Shop and Repairs Formulas
TB 420-14	Sep 80	Engineered Performance Standards Real Property Maintenance Activities: Masonry Handbook
TB 420-15	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Masonry Formulas

TB 420-16	1 Apr 81	Engineered Performance Standards Real Property Maintenance Activities: Moving, Rigging Handbook
TB 420-17	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Moving, Rigging Formulas
TB 420-18	1 Nov 78	Engineered Performance Standards Real Property Maintenance Activities: Paint Handbook
TB 420-19	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Paint Formulas
TB 420-20	1 Aug 83	Engineered Performance Standards Real Property Maintenance Activities: Pipefitting, Plumbing Handbook
TB 420-21	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Pipefitting, Plumbing Formulas
TB 420-22	1 Sep 80	Engineered Performance Standards Public Works Maintenance: Roads, Grounds, Pest Control, Refuse Collection Handbook
TB 420-24	1 Mar 84	Engineered Performance Standards Real Property Maintenance Activities: Sheet Metal, Structural Iron and Welding Handbook
TB 420-25	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Sheet Metal, Structural Iron and Welding Handbook
TB 420-26	1 Nov 79	Engineered Performance Standards Real Property Maintenance Activities: Trackage Handbook
TB 420-27	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Trackage Formulas
TB 420-28	1 Nov 79	Engineered Performance Standards Real Property Maintenance Activities: Wharfbuilding Handbook
TB 420-29	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Wharfbuilding Formulas
TB 420-30	1 Aug 79	Engineered Performance Standards Real Property Maintenance Activities: Emergency/Service Handbook
TB 420-31	1 Dec 73	Engineered Performance Standards Real Property Maintenance Activities: Planner and Estimator's Workbook (Instructor's Manual) (S&I OCE)
TB 420-32	1 Mar 80	Engineered Performance Standards Real Property Maintenance Activities: Planner and Estimator's Workbook, Student's Manual

TB 420-33	1 Aug 83	Engineered Performance Standards Real Property Maintenance Activities: Unit Price Standards Handbook
TB 420-34	1 Mar 84	Engineered Performance Standards Real Property Maintenance Activities: Preventive/Recurring Maintenance Handbook
TB 420-35	1 Apr 81	Tri-Service Coordination of the Moving, Rigging Handbook
TB 420-51	30 Oct 73	Engineered Performance Standards Public Works Maintenance: Facilities Engineering Management of Maintenance Painting of Facilities

# APPENDIX D:

## GEOGRAPHICAL LOCATION ADJUSTMENT FACTORS

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Alabama	State Average	.86
	Birmingham	.96
	Mobile	.86
	Montgomery	.76
	Anniston Army Depot	.81
	Huntsville	.88
	Fort McClellan	.80
	Redstone Arsenal	.88
	Fort Rucker	.80
Alaska	State Average	2.25
	Anchorage	1.92
	Delta Junction	2.70
	Fairbanks	2.13
	Adak	3.88
	Aleutian Islands	3.86
	Anchorage NSGA	1.92
	Barrow	4.18
	Burnt Mtn.	6.86
	Clear	3.10
	Eielson AFB	2.13
	Elmendorf AFB	1.92
	Galena	3.73
	Fort Greely	2.70
	Fort Richardson	1.92
	Fort Wainwright	2.13
Arizona	State Average	1.02
	Flagstaff	1.02
	Phoenix	.99
	Tucson	1.05
	Fort Huachuca	1.22
	Yuma Proving Ground	1.31
	Yuma	1.31
Arkansas	State Average	.89
	Pinebluff	.93
	Little Rock	.83
	Fort Smith	.92
	Fort Chaffee	.92
	Pine Bluff Arsenal	.93
California	State Average	1.21
	Los Angeles	1.20
	San Diego	1.18
	San Francisco	1.25
	Beale	1.28
	Bridgeport NWTc	1.27
	Castle	1.13
	Centerville Beach	1.32
	Desert Area	1.18
	Edwards AFB	1.30



<u>State</u>	<u>Location</u>	<u>ACF Index</u>
California (Cont'd)	El Centro	1.27
	George AFB	1.31
	Fort Hunter Liggett	1.29
	Fort Irwin	1.20
	Le Moore NAS	1.20
	March AFB	1.18
	Mather AFB	1.17
	McClellan AFB	1.17
	Monterey Area	1.23
	Presidio of Monterey	1.23
	Norton AFB	1.16
	Oakland Army Base	1.33
	Fort Ord	1.24
	Port Huenema Area	1.20
	Riverside	1.18
	Sacramento	1.15
	Sacramento Army Depot	1.15
	Presidio of San Francisco	1.25
	San Nicholas Island	2.59
	Sharpe Army Depot	1.13
	Sierra Army Depot	1.33
	Stockton	1.15
	Travis AFB	1.27
	Vandenburg AFB	1.38
Colorado	State Average	.98
	Colorado Springs	.94
	Denver	1.04
	Pueblo	.96
	Fort Carson	1.01
	Fitzsimmons AMC	1.06
	Pueblo Army Depot	.96
	Peterson AFB	.94
	Rocky Mountain Arsenal	1.06
	State Average	1.13
Connecticut	Bridgeport	1.16
	Hartford	1.10
	New London	1.14
	State Average	.99
Delaware	Dover	1.04
	Lewes	.98
	Milford	.96
	Lewes NF	1.04
	Dover AFB	1.04
	Washington	1.03
District of Columbia	Fort McNair	1.03
	Walter Reed AMC	1.03
	State Average	.89
Florida	Miami	.95
	Panama City	.92
	Tampa	.79
	Cape Canaveral	.96
	Cape Kennedy	.96

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Florida (Cont'd)	Gulf Coast	.85
	Homestead AFB	.88
	Homestead	.88
	Jacksonville Area	.85
	Key West NAS	1.08
	Orlando	.80
	Pensacola Area	.85
	McDill AFB	.77
	Eglin AFB	.77
	Tyndall AFB	.92
	State Average	.80
Georgia	Albany	.82
	Atlanta	.87
	Macon	.70
	Athens	.90
	Atlanta-Marietta	.93
	Fort Benning	.71
	Columbus	.71
	Fort Gillem	.87
	Fort Gordon	.94
	Kings Bay	.93
	Fort McPherson	.87
	Fort Stewart	.84
	State Average	1.28
Hawaii	Hawaii	1.29
	Honolulu	1.27
	Maui	1.29
	Alimanu	1.27
	Barbers Point NAS	1.34
	Fort Debussy	1.27
	EWA Beach Area	1.34
	Helemano	1.34
	Hickam Army Air Field	1.27
	Kaneohe MCAS	1.34
	Moanalua	1.27
	Pearl City	1.27
	Pearl Harbor	1.27
	Pohakuloa	1.32
	Schofield Barracks	1.27
	Fort Shafter	1.27
	Tripler AMC	1.27
	Wheeler Army Air Field	1.34
Idaho	State Average	1.11
	Boise	1.05
	Idaho Falls	1.08
	Mountain Home	1.19
	Mountain Home AFB	1.20
Illinois	State Average	1.03
	Belleville	.96
	Chicago	1.09
	Rock Island	1.03
	Rock Island Arsenal	1.06

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Illinois (Cont'd)	St. Louis Support Ctr	.96
	Savannah Army Depot	1.05
	Scott AFB	1.03
	Fort Sheridan	1.10
Indiana	State Average	.99
	Indianapolis	1.03
	Logansport	.99
	Madison	.94
	Fort Benjamin Harrison	1.07
	Crane	1.10
	Crane AAP	1.10
	Grissom AFB	1.06
	Indiana AAP	1.02
	Jefferson Proving Ground	.94
Iowa	State Average	1.02
	Burlington	1.04
	Cedar Rapids	.98
	Des Moines	1.05
	Iowa AAP	1.06
Kansas	State Average	.94
	Manhattan	.97
	Topeka	.96
	Wichita	.88
	Kansas AAP	.94
	Fort Leavenworth	.94
	Fort Riley	.97
	Sunflower AAP	.97
Kentucky	State Average	.96
	Bowling Green	.99
	Lexington	.96
	Louisville	.93
	Fort Campbell	.93
	Fort Knox	.99
	Lexington/Bluegrass Army Depot	1.06
	Louisville NAS	.93
Louisiana	State Average	.92
	Alexandria	.87
	New Orleans	.94
	Shreveport	.94
	Barksdale AFB	.94
	England AFB	.87
	Gulf Outport New Orleans	.94
	Louisiana AAP	.94
	Fort Polk	.94
Maine	State Average	.93
	Bangor	.85
	Caribou	.99
	Portland	.94
	Brunswick	.93
	Cutler	.98
	Northern Area	1.17
	Winter Harbor	.98

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Maryland	State Average	.97
	Baltimore	.95
	Fredrick	.94
	Lexington Park	1.01
	Aberdeen Proving Ground	.94
	Annapolis	1.03
	Fort Detrick	.94
	Harry Diamond Lab	1.00
	Fort Meade	.95
	Patuxent River Area	1.08
	Fort Ritchie	.90
Massachusetts	State Average	1.10
	Boston	1.13
	Fitchburg	1.08
	Springfield	1.08
	Army Mtls & Mech Research Ctr	1.13
	Fort Devens	1.15
	Natick Research & Development Ctr	1.13
	South Weymouth	1.13
	State Average	1.06
Michigan	Bay City	1.02
	Detroit	1.14
	Marquette	1.03
	Detroit Arsenal	1.14
	Northern Area	1.25
	Republic (Elfcom)	1.10
	Selfridge AFB	1.14
	State Average	1.08
Minnesota	Duluth	1.05
	Minneapolis	1.09
	St. Cloud	1.10
	Twin Cities AAP	1.09
	State Average	.84
Mississippi	Biloxi	.87
	Columbus	.81
	Jackson	.84
	Columbus AFB	.81
	Gulfport Area	.87
	Meridian	.92
	State Average	.92
	Kansas City	.92
Missouri	St. Louis	.99
	Rolla	.85
	Lake City AAP	.93
	Fort Leonard Wood	.91
	State Average	1.15
	Billings	1.15
	Butte	1.18
Montana	Great Falls	1.12
	Malmstrom AFB	1.12
	State Average	1.03
Nebraska	Grand Island	1.00

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Nebraska (Cont'd)	Lincoln	1.05
	Omaha	1.05
	Offutt AFB	1.05
Nevada	State Average	1.18
	Hawthorne	1.26
	Las Vegas	1.13
	Reno	1.15
	Fallon	1.28
	Hawthorne AAP	1.26
	Nellis AFB	1.13
New Hampshire	State Average	1.09
	Concord	1.06
	Nashua	1.06
	Portsmouth	1.14
	Cold Regions Lab	1.17
New Jersey	State Average	1.08
	Newark	1.11
	Red Bank	1.08
	Trenton	1.06
	Bayonne	1.10
	Bayonne Mil Ocean Term	1.09
	Fort Dix	1.03
	Earle	1.10
	Lakehurst	1.05
	Fort Monmouth	1.09
	Picatinny Arsenal	1.20
New Mexico	State Average	1.03
	Alamogordo	.99
	Albuquerque	1.03
	Gallup	1.06
	Holloman AFB	1.05
	Kirtland AFB	1.03
	White Sands Missile Range	1.09
	Fort Wingate	1.06
New York	State Average	1.12
	Albany	1.07
	New York City	1.24
	Syracuse	1.05
	Brooklyn	1.24
	Fort Drum	1.18
	Fort Hamilton	1.24
	Seneca Army Depot	1.15
	U.S. Military Academy	1.17
	Watervliet Arsenal	1.07
North Carolina	State Average	.76
	Fayetteville	.76
	Greensboro	.75
	Wilmington	.78
	Fort Bragg	.76
	Camp Lejeune Area	.86
	Cherry Point	.86
	Goldsboro	.77

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
North Carolina (Cont'd)	Pope AFB	.82
	Seymour AFB	.77
	Sunny Point Mil Ocean Term	.78
North Dakota	State Average	1.03
	Bismarck	1.02
	Grand Forks	.98
	Minot	1.10
	Grand Forks AFB	.98
	Stanley R. Hicklesen CPX	1.03
	Minot AFB	1.12
Ohio	State Average	1.00
	Columbus	1.03
	Dayton	.98
	Youngstown	.99
	Cleveland	1.14
	Wright-Patterson AFB	.98
Oklahoma	State Average	.93
	Lawton	.90
	McAlester	.91
	Oklahoma City	.98
	Altus AFB	.94
	Enid	1.01
	McAlester AAP	.91
	Fort Sill	.90
Oregon	State Average	1.05
	Pendleton	1.08
	Portland	1.07
	Salem	.99
	Charleston	1.11
	Coos Head	1.08
	Umatilla Army Depot	1.18
Pennsylvania	State Average	1.00
	Harrisburg	.91
	Philadelphia	1.05
	Pittsburgh	1.04
	Carlisle Barracks	.93
	New Cumberland Army Depot	.91
	Fort Indiantown Gap	1.07
	Letterkenny Army Depot	1.07
	Mechanicsburg Area	.91
	Tobyhanna Army Depot	1.14
	Warminster Area	1.04
Rhode Island	State Average	1.11
	Bristol	1.13
	Newport	1.11
	Providence	1.10
	Davisville	1.17
South Carolina	State Average	.82
	Charleston	.81
	Columbia	.82
	Myrtle Beach	.84
	Beaufort Area	.89

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
South Carolina (Cont'd)	Charleston AFB	.81
	Fort Jackson	.82
	Sumter	.80
South Dakota	State Average	.95
	Aberdeen	.95
	Sioux Falls	.94
	Rapid City	.96
	Ellsworth AFB	.98
Tennessee	State Average	.84
	Chattanooga	.86
	Kingsport	.72
	Memphis	.95
	Arnold AFB	.90
	Milan AAP	.98
	Holston AAP	.71
Texas	State Average	.85
	San Angelo	.76
	San Antonio	.86
	Fort Worth	.93
	Fort Bliss	.96
	Carswell AFB	.93
	Chase Field - Beeville	.97
	Corpus Christi Army Depot	.92
	Corpus Christi	.92
	Dallas	.93
	Dyess AFB	.94
	Fort Hood	.89
	Kingsville	.99
	Red River Army Depot	.78
	Fort Sam Houston	.86
	William Beaumont AMC	.96
	Bergstrom AFB	.95
	Brooks AFB	.86
	Randolph AFB	.86
	Kelly AFB	.86
	Lackland AFB	.86
Utah	State Average	1.03
	Ogden	1.05
	Salt Lake City	1.00
	Tooele	1.06
	Dugway Proving Ground	1.03
	Hill AFB	1.07
	Tooele Army Depot	1.05
Vermont	State Average	.99
	Burlington	1.00
	Montpelier	1.00
	Rutland	.96
Virginia	State Average	.95
	Norfolk	.95
	Radford	.95
	Richmond	.94
	Arlington	1.04

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Virginia (Cont'd)	Arlington Hall Station	1.04
	Arlington National Cemetery	1.04
	Fort Belvoir	1.04
	Cameron Station	1.04
	Dahlgren	1.10
	Fort Eustis	.96
	Humphreys Engineer Center	1.03
	Fort A. P. Hill	.92
	Fort Lee	.93
	Fort Monroe	.94
	Fort Myer	1.03
	Norfolk-Newport News Area	.95
	Fort Pickett	.98
	Quantico	1.03
	Nadford AAP	1.02
	Port Story	.95
	Vint Hill Farms Station	1.08
Washington	State Average	1.09
	Spokane	1.08
	Tacoma	1.07
	Yakima	1.11
	Fairchild AFB	1.13
	Jim Creek	1.34
	Fort Lewis	1.07
	Pacific Beach	1.27
	Puget Sound Area	1.15
	Seattle Area	1.12
	Widbey Island	1.12
	Yakima Firing Center	1.18
West Virginia	State Average	.95
	Bluefield	.92
	Clarksburg	.95
	Charleston	.99
	Sugar Grove	1.15
Wisconsin	State Average	1.06
	LaCrosse	1.04
	Madison	1.02
	Milwaukee	1.13
	Badger AAP	1.06
	Clam Lake	1.20
	Fort McCoy	1.11
Wyoming	State Average	1.08
	Casper	1.07
	Cheyenne	1.10
	Laramie	1.08
	F. E. Warren AFB	1.10



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